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The Journal

OF THE

EAST AFRICA AND UGANDA NATURAL HISTORY SOCIETY

February, 1939.

Vol. XIV

Nos. 1-2 (62-63)

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EDITOR:
A. F. J. GEDYE.

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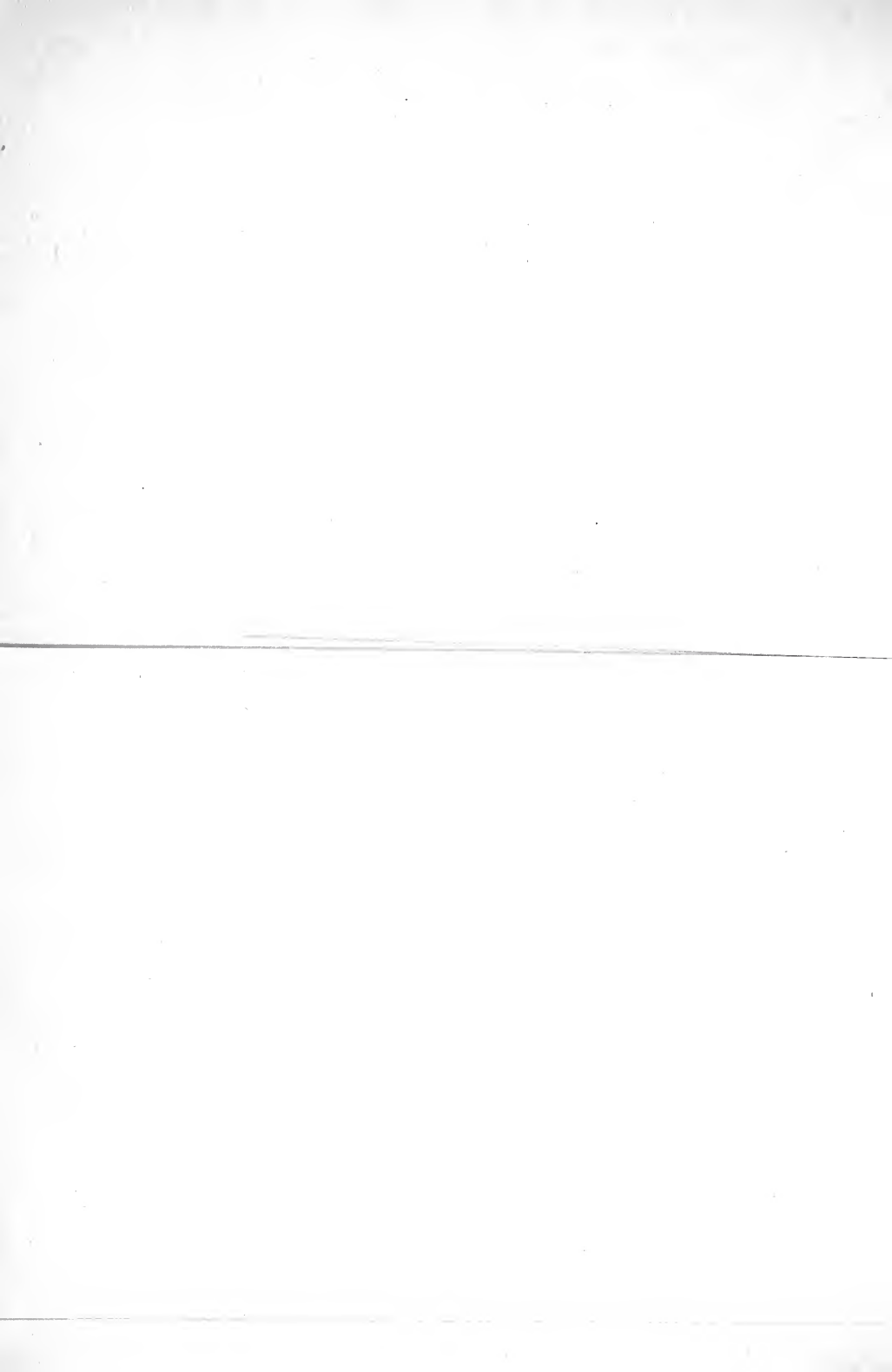
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ERRATA.

Page 3 line 5 for piptedenia read piptadenia.
 , , , 9 , sterculea , sterculia.
 , 5 , 2 , capensis , capense.
 , 9 , 8 , candalabra , candelabra.
 , 14 , 45 , months , weeks.
 , 18 , 17 , artemesia , artemisia.
 , , , , indigophora , indigofera.
 , 61 , 11 , erythrococcus , erythrococca.
Pages 54,61,69, for rapania read rapanea.

EAST AFRICA & UGANDA NATURAL HISTORY SOCIETY.

THE EDITOR REGRETS THAT OWING TO UNAVOIDABLE DELAY,
THE ILLUSTRATIONS WHICH SHOULD ACCOMPANY THE "GENERAL
NARRATIVE" have not come to hand for inclusion in this Journal. They will be
issued as a Separate, or with the next Journal, due in April.



CORYNDON MEMORIAL MUSEUM EXPEDITION TO THE CHYULU HILLS, APRIL—JULY, 1938.

PART 1.

General Narrative.

By V. G. L. VAN SOMEREN.

One frequently reads in the local and overseas Press of Scientific Expeditions to Kenya; what they intend to do, and how they have fared after the "safari" is over. Then, so far as the public is concerned, all is forgotten. Occasionally, as time goes on, the Museum receives papers and Journals containing reports on the results of the expedition. The material and specimens collected are taken out of the country, and Kenya is the poorer by so much. Thousands of pounds are spent on these expeditions, and the public of Kenya gain little. International science may or may not gain. This gradual draining of Kenya's scientific wealth has for many years been regretted by those of us who are interested, and indeed we have chafed against fate that has not brought funds our way, so that the results of scientific work, could in part, remain within the Colony.

There is a saying "that all things come to them that wait"; this may be so, and truly we have been patient, and this patience has in some measure been rewarded. Towards the end of 1937 funds were made available for field work, particularly in connection with botany. This money, a sum of £500, was donated by Mr. W. D. Campbell of New York. At the time the donation was made, we had no Botanist attached to the Museum, but we were making every endeavour to persuade those who "hold the purse strings" that a botanist was a necessary member of the Museum staff. An appointment was made early in 1938.

Our next concern was, how to expend this money to the best advantage? Those of you who have been associated with the Museum for any length of time will have realised that the importance of field work has always been to the forefront, and plans against the day when money would be available had already been formulated.

The Chyulu Hills as a field likely to prove of interest had been marked on the map many years before. They were virtually unexplored, only roughly surveyed, and by reason of the fact that they are situated in the Southern Game Reserve, had remained a more or less unknown quantity. Their situation was suggestive as a possible stepping stone between the Kilimanjaro highlands and those of Kenya.

The last cursory survey of the district was carried out during the war, and this was directed more to the localising of possible water supplies than to general topographical work.

At the outset we were fortunate in enlisting the help of Mr. MacArthur of the Game Department who knew the area better than most, and with his assistance the preliminary arrangements were carried out. Mr. and Mrs. A. B. C. Smith of Kibwezi, together with Mr. Cullen, gave us the hospitality of their comfortable homes before we set out on our safari for the hills, and during our stay on the Range the former very kindly acted as banker and forwarding agent. This assistance was invaluable and greatly appreciated.

The members of this expedition included Mr. Bally (botanist), Mr. Allen Turner (general field assistant), myself, and my youngest son, together with a staff of trained native assistants, and 60 odd porters. Mrs. Bally joined the party toward the end of May.

The Chyulu Hills lie west by south of Kibwezi station at a distance of roughly 25 miles, and the north-west of Kilimanjaro at about 45 miles as the crow flies. The Kibwezi plains with their extensive laval flow lie on the one side, while the Laitokitok plains, lower by several hundred feet, lie on the western side. It was reported that ever-green forest existed on the heights of the range in contrast to the plains vegetation surrounding them. The hills form a compact continuous chain of roughly 30 miles in length, and were said to rise to a height of just over 7,000 feet, the Kibwezi plains being approximately 3,000 feet.

One permanent water spring was known to exist at the northern section of the hills, otherwise there was no surface water, and on this limited supply the party had to exist during the investigation of the entire range. At one time, according to native legend, other springs existed, right up to the time when there was Chagga settlement on the hills, but when these were driven off the hills by the Masai, the retreating Wachagga cast spells on the springs so that they dried up.* The existing spring was the site of their last settlement which they evacuated hurriedly and there was no time to bewitch this last water supply. Be that as it may, there was evidence of some considerable settlement on the northern portion of the range at some time, as distinct from Wakamba settlement at the base of the hills.

A few remarks must be made regarding the approach to the hills. No road exists; the line of approach lies along native paths of which there are two main ones, passing over the hills to Laitokitok, and a third from both Kibwezi and Masongaleni to Taveta. Our first camp was made at Ithaba Swamp, some 12

* The old Wakamba men stated that the previous occupants of the range were *not* the Wachagga of Kilimanjaro but another tribe which had died out after being driven off. This we could not verify.

miles on our way, at an altitude of just over 3,000 feet. Soon after leaving Kibwezi Station, the path leads over an extensive lava flow on which considerable closed forest exists. This peculiar lava-forest is composed largely of *Acacias*, *Commiphora*, *Piptedenia*, and *Euphorbias*, with Fig and stunted *Teclea* and an almost impenetrable under-bush.

Leaving the laval ridge, the path goes through more open country, the dominant trees being *Acacia spirocarpa*, *Boababs*, two species of *Sterculea* (from the bark of one excellent fibre is obtained), and *Commiphora*. This I have termed *Acacia thorn-bush*. Numerous Gneiss outcrops are visible along the path. This belt gives way to a more orchard-like formation; *Combretums*, *Cussonia*, and a few *Acacias* are the chief trees. In this portion the Gneiss outcrops are larger, forming hillocks, many of which are more wooded than the surrounding plains. The path rises through this zone and then drops to the Ithaba Swamp which lies in a depression bordered on two sides by a belt of lava. The swamp holds water only during and just after the rains. When we camped at this spot, the only surface water was held in numerous foot prints of elephant and rhino. This spot is evidently a favourite watering place of game in this area. The water, though muddy, was very welcome. Tsetse flies, of two species, together with *Tabanids* and *Haematopota* (both biting flies), were very numerous throughout the day, but fortunately mosquitoes were not numerous by night.

An early start was made next morning soon after daylight; the porters going ahead, and just as well, for during the night there had been a slight shower and the dew was heavy, leaving the tall grass wet and unpleasant until the sun had dried it off. Successive lava flows were traversed as the path gradually ascended. The going was rough and very hard, for lava is an unpleasant substance to walk on. Many of the lava ridges were thickly covered with *Euphorbias*, *Commiphora*, and *Acacias*, while the intervening zones carried *Combretum*, *Cussonia*, and *Celastracea*.

Toward the foot-hills an extensive lava ridge is crossed and this is thickly wooded. Here one noted many familiar trees such as *Rawsonia*, *Teclea*, *Drypetes*, *Strychnos*, Olive, *Catha*, and a few Cedars. Flowering herbs and shrubs were numerous, conspicuous amongst them being an exceptionally fine blue *Acantha*.

Butterflies were numerous, including *Papilio dardanus*. I mention this species in particular, because it was entirely absent in the forests at the north end of the Range. Wherever the lava outcrop was large and rugged, there, tree growth was most prolific. In many of the depressions and dongas between these lava terraces, the grass was rank and the atmosphere steamy. In

such situations flowering shrubs and herbs were in full blossom, most noticeable amongst them were pink and purple Hibiscus, masses of several species of Convolvulus, both upright and creepers, numerous *Composites* and *Acanthaceae*, *Crotalaria*, and a beautiful orange and maroon ground orchid. On the flowering spikes of the *Crotalaria* were hundreds of orange, and black and white *Lycanids*, feeding on the juices from the plant glands and on the coccid which swarmed on the stems. At about the 3,500 foot level the trees and bush gave way to grass lands interspersed with patches of trees.

In some of the depressions the grass was several feet above one's head and going was rather hard, to say nothing of the cuts one received from the razor-edged grass blades as one forced one's way through. A little further on, a welcome break and interlude presented itself in the form of a derelict plantation where bananas, muhogo, and sugarcane grew in profusion, and large fig trees gave welcome shade. We here halted for an hour to give the porters time to rest and feed. I might mention here that there is no native settlement on the Chyulu hills; the nearest native locations are at Kibwezi. These now abandoned shambas, of which there are four along the base of the hills, were once the site of considerable Wakamba settlement, long since returned to their reserve. Apart from the various crops mentioned, evidence of previous occupation was given in the form of primitive sugarcane mills, vertical and horizontal, by means of which the cane juice was extracted and subsequently converted into beer with the aid of the fruit of the *Kigelia*. Judging by the piles of cane fibre and the number of beer pots stored away in derelict huts, a vast quantity of this potent liquid must have been brewed.

From these shambas, the path ascends steeply through thickly covered grass land and passing along the sides of the hills emerges on to a wide lava terrace with scattered acacia and other trees, mostly *Cussonia* and *Erythrina* in clumps, and after a further rise another lava flow is reached. This is mostly grass covered and flat. Amongst the flowering herbs here met with, mention should be made of a Blue Lupin, a handsome large yellow *Composite*, masses of pink flowered *Sopubia* (*Scrophulariaceae*) streamers of White Clematis trailing over the grass, orange Gladioli, and patches of white Gentians.

As one ascends from the second lava flow patches of forest become visible, mostly in depressions, and these we afterwards realised were situated in old volcanoes. As one enters a forest patch one descends on a steep bank through undergrowth of varying density and if the crater is deep one may descend perhaps two hundred feet until at the bottom one notes that large

trees have ceased and the floor of the crater is covered only by a dense herbage, mostly *Piper capensis*, and a mass of creepers.

Our first mountain camp was reached at about 4 p.m. and we were, as one of the party described it, "completely desiccated." Tea is always a great stand-by, and I imagine on that occasion we must have drunk gallons. On the way up to the camping site we inspected the only permanent water supply of the entire range. This is a semi-circular shelf of lava in a deep cutting, covered with masses of maidenhair fern, and from this, the water drips steadily, though in no great quantity. MacArthur with wise foresight had installed karais along the line of the drips to supplement the primitive wooden troughs, hollowed out from *Cussonia* logs, which had been left in position by the long departed previous residents of the hills. In addition there were two 60 gallon drums now full to the brim, and by keeping these filled daily our water supply was assured.

Arrived in camp, the tents were erected and stores stacked along the sides of a large thatched "banda" which the advance porters had erected. This was to be our "home" for the next month, and very comfortable we found it, except when the wind blew strongly and the moisture-saturated mist descended on the camp, as it did almost every night, soaking everything, including bedding and clothes. One's clothes, kept in a suitcase, became damp and mildewy.

Still, this was all part of the fun. The night temperature was often round about 45°, and with the damp, it was decidedly chilly; six blankets and a hot-water bottle were often needed.

For these minor discomforts, there were many compensations; the view from the camp on a clear morning was magnificent; on the east one overlooked the Kibwezi plains toward Mutha and the Yatta plateau, on the west, the Laitokitok plains with Kilimanjaro towering in the distance. Very often, just after sunrise with the camp bathed in brilliant sun, the surrounding plains would be shrouded in a thick white blanket of clouds. We knew then that within a very short time these clouds would rise, and be blown in both directions upward on to the Chyulu hills and these in turn would be obscured for perhaps three hours before the sun penetrated through.

The northern and central portions of the Chyulu range present many interesting features. Broadly speaking the range here consists of a central ridge of volcanic cinder cones rising to 6,000 odd feet with subsidiary series on either flank. The slopes of these volcanoes are grass clad on the outer side, and within the craters are patches of forest of varying extent. Very few of the craters were devoid of forest. At intervals between the main craters and the outlying series are considerable lava flows; some

almost flat, others with a gentle slope; others again in terraces. On some of the larger and lower lava flows at 4,000 feet considerable cedar forests were a feature.

On some of the larger cones, where disintegration and erosion had taken place, pure stands of *Catha edulis* occurred and alongside these, previous occupants of the foot-hills had developed their sugarcane and banana shambas. Many of the craters descended to 400 and 500 feet and more, and where these were forest clad, one could look across from one side of the forest to the other.

The forest patches varied in size from an acre to more than sixty in extent. In some cases the trees had overflowed the crater rim, so to speak, and had crept along the outer side of the lip, but in such cases the trees were usually somewhat stunted owing to the very strong and ever-present wind. Also, one might note in passing that periodical grass fires were definitely instrumental in restricting forest growth. There was evidence on many sides that this had been the case, particularly with the northern and central portion with which we are now dealing. The presence of forest growth within the craters appeared to be dependent on the extent of surface weathering and disintegration of volcanic cinder, combined with moisture, resulting in a gradual silting up of the crater sides.

It is a remarkable fact, as yet unexplained, that many of the craters did not have large trees growing in the bottom of the depressions. It has been suggested that this might be accounted for by the presence of a volcanic core or plug of lava on which no depth of soil existed. Actually, an examination of such a base by means of a soil drill, showed greater depth of soil and humus in the base than at the sides or lip. The problem is still one of the unsolved riddles of the hills.

One very large crater, measuring over 400 feet in depth and shown on the map of the northern portions of the range prepared by Messrs. Champion and Hitchens, as the "bare crater," contained no forest; merely a few *Erythrina* trees around which *Leonotis* and *Vernonia* had grown. This lack of forest growth is another unsolved riddle. An adjacent crater, known as "Giant Crater," over 500 feet deep, contained cedar on its western slopes, stunted tree growth on its southern aspect with sheer cliffs and a bare "scree" on its north-west aspect.

Taken as a whole it can be said that each crater was forested. An interesting fact was noted that most of the northern and central craters has a break or depression in the lip or wall toward the south-east. It has been suggested to us that this might be due to the prevailing wind blowing strongly during the process of eruption and thus causing a heaping up on the far side and

a denudation of lava ash on the exposed side. This appeared a feasible explanation until one noted that on the southern portion of the range, these depressions were west, south and east. Did the wind change?

During the first two months of our stay on the hills, the rains were on, and as a result, flowering shrubs and herbs were at their best. With the exception of the *Erythrina* and *Cussonia* which are deciduous, the forest trees were ever-green; mist and rain fed, they had developed in the sheltered craters and proved a most interesting study.

Apart from the actual collecting of natural history specimens attention was given to the general geological formation and topography, for undoubtedly these were important factors in any attempt to work out the ecology or general inter-relationship of the species to soil, vegetation and altitude.

In these respects we were fortunate in interesting Messrs. Champion and Hitchens who between them carried out a topography of the north end of the range and studied its geology. Unfortunately these gentlemen were unable to devote more than ten days to the work and the data collected by them was augmented by additional material and bearings carried out by myself during June and July. We now have a sketch map which shows the general topography of the entire range.

The first month was devoted to a study of the northern portions of the range; and toward the beginning of May, Mr. and Mrs. Bally and Turner moved camp and worked the central portion of the range. This was a useful preliminary to the investigation of southern portion. This last section of the hills presents some pretty problems, for in this we find the greatest development of forest growth, mostly on the western side, and at the same time it is at the bases of these higher volcanoes that one finds the most recent evidence of volcanic activity as indicated by vents, blow-holes, and immense lava flows with terraced and parallel lava extrusions more particularly between the main range and the southern Chyulus. As a whole, the eastern aspect of the south end of the main range is more precipitous than either north or central, and there is a lack of any subsidiary line of cones or hills, thus the main ridge slopes steeply to the plains for more than 4,000 feet. These slopes are deeply scored by raised lava ridges with deep gullies in between; many of them showing considerable erosion. In these erosion trenches there is evidence of wearing by water-flow for the cinder and lapelli covering is slight, in many places entirely washed off, so that the hard lava lies just below a sparse covering of dwarf grass. The storm water must here drain off

rapidly. Between the main ridge and the last of the subsidiary cones on the eastern aspect is a wide lava flow deeply scored in the middle where two adjacent lava beds have made contact. In this drainage channel commencing forest has sprung up, limited almost entirely to *Erythrina* at the upper portions, it widens out into mixed forest which eventually makes contact with a considerable patch of similar forest on a large lava flow at the foot of the hills. It is along this chain of gradually extending forest that such species as *Papilio dardanus*, and *Amauris niavius*, entirely absent on the north and central portions of the hills, have extended upwards. It is also along such natural chains that certain species of plains insects and birds have crept up.

So much for the eastern aspect of the southern end of the range. We must now digress and describe the approach to this section, via the plains, carried out by Mr. MacArthur and myself from the old Masongaleni-Noka road. This track is now overgrown and much broken up, except for a narrow path already referred to as going to Taveta. I would certainly not advise anyone to take it unless he has urgent business that way. After the first 15 miles it passes over some of the roughest lava flows I have ever met with. Huge blocks of lava clinker, covered with either lichen or stunted forest growth, ran in parallel lines for miles. Their abrasive qualities had to be experienced to really be known. Nevertheless, through such places one noted recent tracks of elephant and rhino; how they move over such ground is a marvel. Emerging from this rough going one enters portions of rising ground with forest growth of fair proportions, and in the valleys were evidence of previous cultivations. These old shambas were now densely overgrown with every imaginable sort of thorny scrub up to eight or ten feet high, and impassable except by cutting one's way through. I certainly think this portion was far more difficult to traverse than were the lava beds. We had counted on finding water in a rock pool at Noka (a solitary gneiss outcrop), which was our objective for the first day's trek, but on arrival late in the afternoon, we found that the elephant and rhino had been there before us and not more than a gallon of very brackish water remained. That night we went short rationed, cheered by the thought that at our next camp there would be water from two giant fig trees in the forest. The first four miles next morning were hardly less trying and tiring than that of the day previous, but we cut our way through, doing about a mile an hour. This part over, the track began to rise over wide lava terraces on which the dominant trees were a species of *Strychnos*, spaced so regularly that it gave one the impression of an immense planted apple orchard.

The going was certainly better, but the lava worked havoc among the porter's feet. At length we reached the main lava flow which separates the south end of the main Chyulus from the Southern Chyulus. Here were lava ridges running in parallel series in a south-easterly direction, with every degree of extrusion from a mere ridge to cones and blow-holes twenty and thirty feet high and of comparatively recent lava. Some were entirely bare, others were crowned with *Candalabra Euphorbias* and other succulent plants.

Here also were the famous lava domes three to ten or 15 feet in diameter, with thin crusts of lava covering a vent. On opening up some of these one noted that the inner surface of the crust was blued, and many of the holes went sheer down into pitch blackness and if a stone was dropped down one could not hear it touch bottom. Alongside some of these blow-holes were parallel lava pipes, exposed along the top, like badly-laid drain pipes, completely hollow and perforated toward the end. Some of the lava extrusions from these vents were of the twisted rope formation; others in "drop" formation as though the viscid lava had been forced up and through a series of openings and had "set" or solidified on cooling.

It was a most interesting spot but hard going. Arrived at the site for the camp, we next went in search of the water trees in the forest nearby. Again our luck was out; one tree was split as by lightning, and the other had rotted at the base and no longer held any water. We were thus rationed to one cup of water each; our only hope of water was at Campi-ya-Simba, some ten miles off on the Taveta track. This pleasant little tramp we reserved for daylight next morning. All available receptacles that might hold water were collected over-night, and two porters were assigned to each, with orders that at day-break they were to start. It was not until 2 p.m. that afternoon that we had our first real drink since leaving the dam on the Masongoleni track. The tramp to Campi-ya-Simba was not without interest, for one was thus able to study the formation of the Chyulu hills from the south-western aspect.

The main lava flow stops short of the narrow neck between the last of the main volcanoes of the Chyulus proper and the semi-circular series of cones forming the Southern Chyulus. A patch of thin forest slopes down out of the crater on the last hill and runs into a steep-sided valley, and this is succeeded by a double lava terrace; the first with a gradual slope and then more abrupt downward to the Masai plains where the lava is turned south-west by gneiss outcrops. Many of the gneiss outcrops stand sheer out of the plains and form a distinctive feature of the area. The Taveta track crosses and recrosses a considerable lava flow, some

of it covered in tree growth, but much entirely bare except for lichens and a few succulent plants. The north-western margin of the flow is abrupt and defined and stands well above the plains and it is on this side that the famous Italweni "blow-hole" exists. This hole is of immense size with precipitous sides descending some thirty to fifty feet with a cavern at one end, and here, natives coming to and from Taveta take shelter for the night. The cavern is capable of accommodating about 80 individuals. Another feature of interest is a volcanic cone with a perfect rim; the interior is sparsely grass grown and its outer slopes are thickly covered with grass which ends abruptly at a wide ring of volcanic clinker varying from twenty to sixty feet in width. Many of the lumps are over a foot through and lie piled on top of each other in a rugged wall; it is entirely devoid of vegetation. Beyond this belt, a tangled mass of creepers and stunted trees and masses of coarse lichen merge on to the plains. The western aspect of the first southern Chyulu hill is covered with a pure stand of *Catha edulis*. This tree is of particular interest for its leaves, bark, and roots contain an invigorating substance which is valued by natives, Somalis, and Indians. The leaves and roots are chewed and report has it that on a long safari no sense of fatigue is felt; furthermore, elderly folk who would otherwise be unable to do a journey are buoyed up by chewing these leaves and suffer no ill effects from the exertion of the safari. While we were in residence at Camp 1, a party of old men and women passed through and each was carrying a bunch of these leaves from which they took a bite as they went along.

We were dead beat when we got back into camp from the Italweni track, but having obtained a supply of water for the next lap toward the hills at 6,500 feet we felt more contented, and we counted on finding water again at our next camping site, water which we knew would have to be brought from Camp 2, somewhere about the centre of the range. Our luck was out, for late that evening two of our old porters turned up from Camp 2 with a note to say that this camp was about two days' march from where we now were, and that the water supply was anything but sufficient. The position was serious and after talking it over we decided to push on and establish a camp on the highest ridge of the south end, yet within reasonable distance of Camp 2 on which we were dependent for water supplies. We agreed to cut down our porters to a minimum, retaining six for future water-relay purposes and the remainder to return to Masongaleni in one lap. The water we had was divided into two portions sufficient for one day for both parties. We shifted camp soon after daybreak next morning taking only such loads as were necessary for future collecting; our food supply was nearly exhausted for we had reckoned on making contact with Camp 2 without difficulty.

There was no known track from the Italweni lava flow up to the hills so we took the most direct line which meant a steady rise of 2,000 feet in little more than two miles over loose volcanic gravel where a false step meant a downward slide of several feet. At the end of three hours, the porters were nearly done in, in spite of changing loads every half hour, and we had as yet covered only half the distance, so a halt of half an hour was called. The going was extremely difficult and we agreed to march for one more hour and pitch our camp wherever we happened to be. We were then about 1,000 feet below the forest edge. Scanning the upper slopes with binoculars we noted what appeared to be a track and made for this point. It turned out to be an old buffalo trail which ran along the hill side and it was surprising how easy the gradient was, and had we known it, this track ran almost the entire length of the southern hills and entered the forest beside which we had pitched our camp the previous day some half a mile higher up. We eventually made the forest edge at the lip of an immense crater and here the porters off-loaded, not without sighs of relief. While the tent was being erected our small supply of water was divided between the porters, leaving about four gallons which had to last at least one more day between eight of us. We had a bite of food, washed down with tea and then MacArthur returned with the balance of the porters and empty water tanks to the Italweni camp and so on to Noka and the Masongoleni road dam, promising to send up posho and water as soon as Kibwezi was again reached. Contact with Camp 2 was made the next day, the porters carrying an S.O.S. for water and posho. The following day Bally turned up, having taken four and a half hours between camps, travelling light, via the lava flows at the base of the hills. We discussed the water problem and figured out that water would have to be carried roughly fifteen miles in two relays each day, from Camp 1 in order to supply just sufficient for cooking purposes. It was thus impossible to close down Camp 2 and transfer all activities to the southern hills, for it had to be maintained as a forwarding centre. A brief reconnaissance of the possibilities of Camp 3 made it amply clear that this southern end must be worked; the miles of the Great Chyulu Forest lay before us, as yet untouched. In the two days I had already spent at this spot, several birds unrecorded from the north and central forests had been obtained; insects and flowers not hitherto met with were here in abundance; and a general survey of the southern end of the range had to be carried out.

Food, water, and a redistribution of the porters for relay purposes were the problems to be faced. We ultimately fixed up a working arrangement which would ensure a bare sufficiency

of water amounting to eight gallons every two days for 10 persons; certainly not much, and washing, baths, and even shaving became things of the past. We finally arranged that Turner should remain on in Camp 2 to supervise the water arrangements, while Bally and Mrs. Bally joined me at the southern camp. The distance between the two camps, although only about six miles in a straight line, was nearer 11 by the route Bally had taken, which meant a four and half hours trek, so my first endeavour was to cut as direct a traverse through the great forest as was possible, and by keeping to the higher ground we eventually had a line of communication of two and a half hours' walk. In this work we were assisted to an enormous degree by making use of buffalo trails, for these forest animals, far from being a nuisance, gave us the line with the best gradients and thus fairly easy going. These buffalo tracks are wonderfully graded, and we very soon found that they had regular paths throughout the forest of which we availed ourselves on many occasions. In order to facilitate collecting and to avoid the persistent wind which blew strongly and most unpleasantly, I shifted my camp to a sheltered spot at the edge of the high forest at 6,500 feet.

Here we erected a substantial "banda" as a work room, and having got thoroughly settled in we commenced a thorough survey of the great forest which extended for miles below and above us. From this camp we obtained a wonderful view of the immensity of continuous forest growth, which, measured as one block was roughly five miles by three to four, of splendid timber, with large blocks of outlying forest to the south and west. The highest Chyulu peak, covered in dense forest, rose to 7,200 feet in the centre of the biggest block. In order to obtain a general idea of the contents of the forest, both botanically and faunistically, and to facilitate topographical work, we cut traverses in several directions. From these cuttings we were able to appreciate the fact that this now immense forest had originated, as was the case in the northern section, as crater and valley forests which had, because of its sheltered position, extended and become confluent and gradually merged into one more or less huge block. I personally visited all the high ground within the forest and explored each of the craters which were now densely wooded. It was a noticeable fact that most of the highest points carried a pure stand of a large leafed Croton and in cutting traverses on high ground, the presence of this species indicated that one was nearing the top of the cone. The whole of the forest floor was damp, being drenched almost nightly by heavy mist and dew, and the rotting vegetation and humus formed a carpet in which ferns and ground orchids abounded. The wettest portions of the forest were those on the western aspect of the hills. Here

the trees were laden with mosses and ferns and were dripping wet all day long. In these forests we obtained six species of birds which were not recorded previously, and others which were distinctly scarce in the central forests were here abundant. The beautiful mauve-tinged ground orchid *Calanthe volkensii* grew in perfection and literally carpeted the forest floor in places, whilst giant ferns (not tree ferns) with fronds over ten feet long, relieved the dominant *Piper* undergrowth in large patches. Many of the forest trees grew with straight boles to over 100 feet from a girth of 7-8 feet.

This Great Chyulu forest is a good example of an evergreen mist-forest. The main portion, seen from above, gave the impression of being in a huge basin with high sides, with here and there lesser hills entirely forest clad within the basin. The eastern rim, devoid of forest on its outer aspect, sloped steeply to the Kibwezi-Masongaleni plains, while the western rim, which was forest clad, sloped more gradually to the Masai plains. These high forests were intensely cold even at mid-day with the sun shining brightly.

Within the forests buffalo were numerous; two herds 20 and 25 strong roamed the forest below our camp and emerged on an mbuga or open grass-covered flat at the edge of the forest, morning and evening. Solitary bulls were not infrequently encountered during our tramps through the heavy forest undergrowth. Leopards and forest pigs were seen and heard; Sykes monkeys were in large troops, whilst at night galagoes cried until the early morning. Tree hyrax were present but seldom seen. More than once, serval cats were put up in the long grass on the eastern slopes. Reedbuck were noted in twos and threes on the higher exposed grassy slopes on the eastern face; Eland, Greater Kudu, Kongoni, and an occasional Duiker were seen in the grass lands between the main ridge and the outlying cones of the central portions, on the eastern side. An occasional Lion was heard and twice animals killed by them, a Buffalo and a Reedbuck, were found. At the northern end a solitary Giraffe visited Camp 1. The forest Pigs were of an enormous size, but we were unable to ascertain the species. At many places along the edges of the higher forests at 6,800 feet we noted areas where they had been routing amongst the herbage.

For purposes of taking bearings and observations, every high point in the southern portion of the range was visited by means of forest traverses, every foot of which we had to cut through thick and soaking undergrowth. Hardly any rain fell during the last six weeks on the hills, yet the forests were kept saturated by mist and heavy dew. Bearings were taken right through to the second camp just north of which Hitchens and Champion had

carried out their final observations and established beacons. Working back from these and other fixed points we were able to produce a sketch map which shows the general topography of the entire range. These bearings, supplemented by panorama photographs, give one a good idea of the general formation of the hills.

Two special visits were paid to the highest ridge of the range, 7,200 feet, which, as I have already mentioned, was densely forest clad. On the first occasion we checked up this point with observations and bearings taken at various northern and southern beacons; subsequently it was worked botanically and faunistically. One particular feature, from a botanical and faunal point of view, was of great interest. The top of the ridge consisted of a narrow gently rising plateau not more than forty to fifty feet wide, on the sides of which giant trees, *Cornus volkensis*, grew in the form of a great natural avenue, with their branches almost meeting overhead. Along this avenue were Buffalo paths leading to the highest point and here the beasts had trampled down the vegetation into two large "bomas" in which obviously they spent a considerable portion of the day. On both visits Buffalo had been in recent occupation as fresh dung was present on all sides. From this ridge, the ground slopes steeply east and west and on the south-western aspect is a very deep crater now densely forested, which had formerly supplied much of the lava now lying below the floor of the Great Chyulu Forest.

It can be safely assumed that the forest growth at the southern end is the result of greater moisture and shelter as a result of the general conformation of the range, though with the limited time at our disposal we were unable to obtain evidence that it was any older than that of the north end. It would appear from such evidence as we obtained that the main ridge of volcanoes of the south were subjected to less general tectonic activity than those of the north and that subsequent to the throwing up of the main ridge, subsidiary activity was limited to the bases of these main cones. In the meantime the weathering and disintegration of the lava, assisted by the heavy deposition of moisture in this area, produced a soil on which tree growth was more readily established than was the case in the north.

Throughout our residence on the south end heavy banks of mist were continually carried on to the hills from a south-westerly direction, in fact, it often happened that the higher points of the forest were entirely mist covered up to noon. No cloud or mist was driven up from the east, and as already mentioned, this aspect of the range was more or less clear of forest growth except in the sheltered craters.

During the last month or six months on the hills we were short rationed for food and water and tobacco, but the abundance of material and data collected amply repaid us for any hardships.

REPORTS ON THE CORYNDON MUSEUM EXPEDITION TO THE CHYULU HILLS.

PART 2.

THE BIRDS OF THE CHYULU HILLS.

1. Introduction.
 - (a) General topography.
 - (b) General description of avifaunal zones.
 - (c) Bird fauna.
2. Systematic List, Field Notes, and Taxonomic Notes.

By V. G. L. VAN SOMEREN, M.B.O.U., C.F.A.O.U., etc.

GENERAL INTRODUCTION.

A general outline of the topography of the range has been given in the opening narrative; it remains now to supply a more detailed description of the area covered by this report, in relationship to the avifauna. The Chyulu range is entirely volcanic in origin and would appear to have erupted through a line of faults in the basement complex from about the junction of Lat. 20° S. and Lg. 38° in a N.W. direction towards Simba, and now separating the Kibwezi plains from those of the Kilimanjaro-Laitokitok area.

The Kibwezi plains now fairly dry, and covered with an Acacia-Commiphora-Baobab-Euphorbia association, and later by a Combretum-Acacia, the so-called orchard or park-land associations, had been in parts considerably heightened by a series of lava flows from the Chyulu hills, most of which run in a southeasterly direction. The country is fertile and the grass and bush growth dense. The drainage off the hills to the east follows the general line of the lava flows and permanent surface water is present in the Kibwezi river valley.

The level of the plains can be taken as between 2,000 and 3,500 feet with a gradual rise by laval terraces towards the hills, interrupted at points by laval ridges on which vegetation is modified and more prolific. A different association of trees is present, and many of those noted, are common in the dry "closed" forests around Nairobi (Teclea, Olea, Drypetes, Strychnos, Piptadenia, etc.). The elevation of these mixed forests is approximately 3,000-4,000 feet. On some of the larger more disinte-

grated flows, cedar is present especially toward the north of the Chyulu hills. Nearer the base of the hills the lava ridges are more abrupt, the depressions between them have been partially silted up. Vegetation is rank and the atmosphere humid and definitely tropical. It is in such places that one finds species of *Liptenines* and other Lepidoptera usually associated with these particular climatic conditions. Toward the bases of the outer volcanic cinder cones, the lava flows take the form of wide terraces with intervening depressions containing disintegrated larva and humus washed down from the hills, thus forming extremely fertile pans at roughly 4,000 feet. In such places Wakamba natives had at one time established "shambas" of sugarcane, maize, muhogo, and bananas. From this level the hills rise abruptly in a series of cinder cones, many of them with marked erosion lines forming dongas and crevices. The volcanic cones are interrupted here and there by lava flows which have arisen from the main ridge of long extinct volcanoes. Some of the outlying cones have craters of varying dimensions with small commencing forests. In the valleys and on the lava flows the dominant trees are *Erythrina*, *Combretum*, *Cussonia*, and species of *Acacia*. Up to this point the bird fauna is typical of the plains and bush country. Amongst others we find the following:

<i>Mirafr</i> <i>fischeri</i> .	<i>Anthoscopus</i> .
<i>Mirafr</i> (<i>africana</i>) <i>herterti</i> .	<i>Parus afer</i> .
<i>Lamprocolius chalybeus</i> .	<i>Rhodophoneus cathemegmanus</i> .
<i>Erythropgia leucoptera</i> .	<i>Laniarius funebris</i> .
<i>Cisticola cheniana</i> .	<i>Nilaus minor</i> .
<i>Cisticola cinereola</i> .	<i>Telophorus quadricolor</i> .
<i>Calamonastes simplex</i> .	<i>Tschagra senegala</i> .
<i>Andropadus insularis</i> .	<i>Indicator indicator</i> .
<i>Batis molitor</i> .	<i>Indicator minor</i> .
<i>Buchanga adsimilis</i> .	<i>Cinnyris albiventris</i> , etc.
<i>Coracias caudatus</i> .	

Lophocerus erythrhorhynchus.

 " *deckeni*.

 " *flavirostris*.

Phoeniculus p. marwitzi.

Corythaixoides leucogaster.

(In addition several species of Weavers and Finches not met with on the hills.)

* The birds are referred to binomially; the racial designation is given in the systematic list which follows.

In the north-eastern portions of the foot-hills, and to a lesser degree along its eastern aspect, all about the 4,000 foot level we find patches of mixed savannah forests, and in these, certain of the "thorn-bush" "parkland" birds find their way toward the hills. A few of these extend up to about the 4,500 feet level for feeding purposes. As already mentioned, these sparse forests are situated on the lower lava flows and their depressions, where cultivation has at one time existed. The birds round here feed and roost in these places. The chief species are as follows:

<i>Oriolus monachus.</i>	<i>Sitagra ocellaria.</i>
<i>Batis molitor.</i>	<i>Poliospiza angolensis.</i>
<i>Smithornis capensis.</i>	<i>Anaplectes melanotus.</i>
<i>Prionops poliocephalus.</i>	<i>Estrilda estrild.</i>
<i>Malaconotus approximans.</i>	<i>Estrilda rhodopyga.</i>
<i>Dicurus adsimilis.</i>	<i>Streptopelia torquata.</i>
<i>Melaeornis ater.</i>	<i>Pternistes leucocephus.</i>
<i>Telophorus quadricolor.</i>	<i>Numida mitrata.</i>
<i>Lybius leucocephalus senex.</i>	<i>Cossypha semirufa.</i>
<i>Melittophagus cyanostictus.</i>	<i>Camaroptera brevicaudata.</i>
<i>Amblyospiza albifrons.</i>	

Above this elevation the ground rises steeply to the outlying volcanic cones and is entirely grass covered. Between these outer hills are a series of higher lava flows in terrace form, entirely grass covered, and carrying small scattered clumps of bush and what I have called an "Erythrina-Cussonia-Combretum association." Some of these flows are of considerable extent and carry a large acreage of this "Erythrina association," and bird life is here numerous, but of a type largely associated with the low country. The average elevation is about 4,500 feet, but some of the flows are 5,000 feet. The principal species found here are:

Campothera nubicus.
Halcyon chelicuti.
Tricholaema lachrymosa.
Pogonilius pusillus.
Indicator indicator.
Indicator minor.
Sigmodius retzii.
Nilaus minor.
Laniarius funebris.
Eurocephalus ruelli.
Chlorophoneus sulphuripectus.
Tschagra senegala (in bush and grass).
Turdoides hypoleuca.

Centropus superciliosus (bush and grass).
Parus albiventris.
Parisoma böhmi.
Eremomela griseoflava.
Nectarinia kilimensis.
Chalcomitra senegalensis.
Sylvietta whytii.
Cisticola brachyptera.
Mirafra fischeri (grass lands).
Dinemellia dinemelli.
Anaplectes melanotis.
Estrilda estrild.
Euplectes capensis.

On the higher ground or moorlands between 5,000 and 6,500 feet, where the grass is associated with woody herbs, as *Sopubia*, various Composites (such as the large yellow *Coreopsis*), *Diplolophium*, *Artemesia Indigophora*, Lupin, and the orange and red *Gladiolus*, a more limited bird fauna is found, which is definitely associated with these higher elevations. The most plentiful amongst them are:

Nectarinia formosa (feeding on *Gladiolus*).
Cisticola natalensis.
Cisticola aridula.
Schoenicola brevirostris.
Melocichla mentalis.
Saxicola torquata.
Tschagra senegala (for food only).
Anthus nicholsoni.
Francolinus africana.

It is at these elevations that we find the first patches of true alpine forest, but limited entirely to the craters of the many volcanic cones which form the central or main ridge of the range. A detailed botanical survey of this forest was carried out and is embodied in the Botanical Report, Cf.

The forests of the northern end of the range are evergreen, but compared to those of the southern portion are, on the whole, much drier. The exceptions are those contained within deep craters where evaporation due to sun and wind is reduced to a minimum. At the central portion of the range there is a definite constriction due to the "tail-out" of the subsidiary volcanic cones, especially on the eastern aspect, leaving only the main ridge which rises to an average of 6,500 feet and carries on to the highest peak at 7,200 feet. This high ridge is almost devoid of



Lilac-breasted Roller (*Coracias caudatus*).

forest on its eastern face and is deeply scored by erosion trenches and gullies. At the point where the last subsidiary cone ends there is a considerable lava flow which carries a commencing valley forest and this extends eastward and becomes contiguous with a low mixed forest on a lava flow at 4,000 feet. It is along this belt that many species of birds and lepidoptera of the low country have extended on to the upper lava flows at 5,000 feet. The western aspect of the main ridge, however, carries a heavy forest, the result of confluent crater and valley forest formations, and these are continuous with the southern forests and so on to the Great Chyulu Forest of the southern end of the hills. The range widens out just north of the highest point in the form of an eastern series of cones set in a semi-circle, and a western series of lesser cones, with between them, a very large lava flow long since entirely covered with a dense forest growth, the result of confluent crater forests. This block is now referred to as the Great Chyulu Forest. This extensive forest, roughly 12 miles by four to five wide, is a typical rain or mist forest. It is continually drenched with mist and heavy dew, and the floor is perpetually wet and sodden. It is in this section of the range that the tree trunks and branches are covered in moss and ferns, whilst the canopy is thick with beard moss and dripping wet throughout the day. This portion of the Chyulu forests contains such species as *Geokichla*, *Bradypterus*, *Turdus*, *Pseudoalcippe*, *Pogonocichla*, *Cryptospiza*, and *Aplopelia*, to mention only a few, in the greatest numbers; in fact they are here, exceedingly common. Most of the timber trees here grow to well over 100 feet with clean boles and many carry a tangled mass of lianas of various species. The mid-growth is heavy, whilst the undergrowth consists largely of *Piper*, giant ferns, and ground-orchids.

The montane forests can be divided into zones, working from the periphery inward, and into strata, horizontally and vertically. Thus we record a marginal zone, an edging or fringing forest zone and a mid zone; forest floor, undergrowth, and mid-stratum and canopy.

In the outer or marginal zone we find a definite association of woody herbs and creepers: *Leonotis*, *Vernonia*, *Artemesia*, *Coreopsis*, *Heteromorpha*, *Lantana*, *Desmodium*, and *Cissus*, and in the central and southern portions, giant *Lobelia*. In some of the northern drier forests *Erythrina* still exists as marginal or fringing trees. (With the outward extension of the forest *Erythrina* die.)

This marginal zone has its quota of bird life for part of the day, if not at all times. Here at the 5,000-7,000 levels we find:

- Prinia mystacea.
- Zosterops (feeding on *Lobelia*).
- Nectarinia formosa (feeding on *Lobelia* and *Leonotis*).
- Nectarinia reichenowi (feeding on *Lobelia* and *Leonotis*).
- Cinnyris mediocris (feeding on *Lobelia* and *Leonotis*).
- Cyanomitra olivacea (feeding on *Lobelia* and *Leonotis*).
- Laniarius ferrugineus.
- Alseonax murinus.
- Lagonosticta rubricata.
- Coccygia melanotis.
- Melocichla mentalis.

Within this marginal fringe, the edge of the forest growth forms the feeding ground of various species, and the roosting site of many others. These edges are characterised by a dense tangled mass of creepers: *Cissus*, *Clematis*, *Jasmin*, *Hibiscus*, and Composites, associated with marginal forest trees such as *Rapanea*, *Catha edulis*, and *Celastraceae*. The species usually noted are:

- Francolinus squamatus (on the ground).
- Laniarius ferrugineus (among the creepers).
- Cossypha caffra " " "
- Cossypha semirufa " " "
- Dryoscopus cubla " " "
- Tschagra australis " " "
- Dendropicos fuscescens (on trees, hunting for food or
- Viridibucco leucomystax roosting at night)
- Colius leucotis " " " "
- Pycnonotus tricolor " " " "
- Dioptrornis fischeri " " " "
- Alseonax murinus " " " "
- Seicercus umbrovirens " " " "
- Ploceus reichenowi " " " "
- Ploceus nigricollis " " " "
- Nectarinia formosa " " " "
- Nectarinia kilimensis " " " "
- Zosterops sp. " " " "

In the body of the forest, there are strata as already indicated, which are frequented for purposes of food or for roosting, and certain species are to be noted in these, as follows:

FOREST FLOOR:

- Francolinus squamatus (roosting in mid strata or fringing trees).
- Aplopelia larvata (feeding on ground; roosting in mid-strata).

Geokichla gurneyi (feeding on ground; roosting in mid-strata or thick undergrowth).

Turdus olivaceus (feeding on ground as well as on berries, roosting in mid and fringing trees).

Pogonocichla stellata (feeding, roosting in mid-strata).

Phyllastrephus fischeri (when feeding on ant trails).

FOREST UNDERGROWTH AND MID-STRATUM:

Aploderma narina (mid-stratum for food and roosting).

Phyllastrephus fischeri (food and roosting).

Seicercus umbrovirens (food, and roosting in mid-stratum).

Pseudoalcippe abyssinicus (food, and roosting in mid-stratum).

Turdus olivaceus (food, and roosting in mid-stratum).

Pogonocichla stellata (food, and roosting in mid-stratum)

Bradypterus cinnamomeus (food, and roosting in undergrowth).

Bradypterus mariae (food, and roosting in undergrowth).

Zosterops sp. (food, roosting in mid-stratum).

Cryptospiza salvadorii (feeding on special grasses, roosting in mid-stratum).

Cyanomitra olivacea (roosting in mid-stratum).

THE BIRDS OF THE FOREST CANOPY.

The majority of birds found in this stratum during the day time are engaged in hunting for insect food or feeding on fruits. Very few actually spend the hours of night in this stratum or in its vicinity. The groups may be divided as follows:

Columba arquatrix (feeds in the canopy and roosts just below, but more often seeks its food away from the forest).

Vinago calva (feeds in canopy of fruit-bearing trees, often out of the forest proper; roosts below the canopy).

<i>Pholia femoralis</i>	} These feed on fruits in the canopy or on trees outside the forest, roosting just below the canopy.
<i>Pholia sharpei</i>	
<i>Cinnyricinclus</i>	
<i>leucogaster</i>	

Apalis nr. *moschi* (feeds in canopy).

Apalis griseiceps (feeds in restricted places in canopy; roosts in thick cover of mid-stratum).

Seicercus umbrovirens (feeds partly in canopy, roosts in mid-stratum).

Zosterops sp. (feeds in canopy, roosts in mid-stratum).

- Dryoscopus cubla* (feeds in canopy (partly) and roosts in mid-stratum).
- Viridibucco leucomystax* (feeds in canopy (partly); roosts in lianas and mid-stratum).
- Buccanodon leucotis* (feeds in canopy of fruiting trees; roosts in old nest holes).
- Arizelocichla milanjensis* (feeds in canopy of fruiting trees, roosts in lianas and mid-stratum).
- Anthreptes collaris* (feeds in canopy, roosts mid-stratum).
- Cinnyris mediocris* (feeds in canopy (partly), roosts in mid-stratum).
- Cyanomitra olivacea* (feeds partly in canopy, roosts in mid-stratum).
- Dioptornis fischeri* (feeds partly in canopy, roosts edge of forest).

I have endeavoured in the preceding notes to indicate the distribution of the bird fauna, within certain types of environment, such as we noted them, on the Chyulu hills. In some cases, it is difficult to assign a species to any one environment, for the periodical variation in food supply, whether insect or vegetable, governs the movements of the birds to a considerable degree.

Birds are affected by climatic conditions in a marked way; thus on a day when mist clouds were still passing over the forests as late as noon, birds usually found hunting through the canopy would be found on the sheltered side of the forest, at its edges. Again, with the approach of late afternoon, before sunset, one often found the birds to move over to that part of the forest edge which was in the full rays of the sun. If the weather was very cold, one found them in the sheltered portions of the forest.

It was my practice, just before sunset, to walk very slowly along one of the many forest traverses in order to note the movement of the birds when seeking their roosting places. One obtained much information in this way.

SYSTEMATIC LIST
AND
TAXONOMIC NOTES,
WITH
DESCRIPTIONS OF NEW RACES.

FALCONIDAE.

GYMNOGENYS TYPICUS. Long-legged Harrier-Hawk.

Raptorial birds were remarkably scarce on the range and this species was noted on three occasions only. Skinks of various species were plentiful on the moorlands and on each occasion this hawk was noted, it was on the ground eating one of these lizards.

The single adult female obtained has enlarged ovaries.

SPECIES IDENTIFIED BUT NOT OBTAINED:

Buteo rufofuscus augur. Augur Buzzard

At Camp I a pair of *Buteo rufofuscus augur* were seen daily in one of the large shallow craters uncovered by forest. They hunted the grass lands around the camp and were often noted to take "mole-rats," other rodents and a few lizards. They used to circle out over the lower lava flows just about 4 p.m. and invariably returned to roost in a large *Cussonia* tree about half a mile from our camp site.

Falco peregrinus minor. African Peregrine.

A pair were noted on the Great Lava Flow at 4,500 feet during the last week of June.

Falco chiqueri ruficollis. Red-naped Falcon.

On the south-western slopes of the range where there was a deep valley between the main volcanic ridge and the western out-lying volcanoes, a beautiful pair of these birds haunted the small patches of crater forests. On many occasions one saw them flying high over a patch of forest then they would turn and divide; one bird, usually the male, would then fly low over the trees while the hen skimmed the margin at about the level of the tree tops and swiftly passed to the far side, then up. The flight of the male would invariably cause some bird, usually a Pigeon, to leave the shelter of the trees, when the hen would then make a dive and strike. I tried hard to obtain this pair, but they outwitted me on all occasions.

Terathopius ecaudatus. Bateleur Eagle.

A few were noted over the western plains but none actually on the range.

Milvus migrans parasiticus. African Brown Kite.

A few were noted on the lower western lava flows, in July.

Gypaetus barbatus? African Lammergeyer.

A single bird undoubtedly of this species was twice seen circling round the "Needle" Gneiss outcrop on the western plains. One obtained an excellent view of the bird with binoculars.

Aquila rapax. Tawny Eagle.

Two birds were seen flying over the face of "Hyrax Cliff" on the western aspect of the northern Chyulus. I was at the bottom of the cliff, observing a *Cossypha* when my attention was drawn to a chorus of chuckling from the Rock Hyrax and looking up, these birds were noted passing slowly along the cliff.

VULTURES.

Three species of Vultures, *Pseudogyps africanus*, *Trigonoceps occipitalis*, and *Necrosyrtes monachus pileatus*, were common on the lower plains especially on the western side, and resorted to a few tall dead trees on the west of the Great Chyulu Forest for roosting purposes.

PHASIANIDAE.

NUMIDA MITRATA REICHENOWI. Reichenow's Helmeted Guineafowl.

Several nomadic flocks were encountered on the hills, but they never stayed in any one spot for more than a couple of days. They frequented the sides of the hills where the grass had recently been burnt off, and the new grass was not more than a few inches high. There was evidence in the smaller forest patches that the floor had been thoroughly scraped over for food. They roosted in the trees of the smaller patches of forest. The highest elevation at which a flock was noted was 6,500 feet.

GUTTERA PUCHERANI. Blue-necked Crested Guineafowl.

This species was not met with on the range, but in many of the lowland forest patches it must have been plentiful, judging by the numerous scapes and dropped feathers. It was not noted above 4,000 feet.

PTERNISTES LEUCOSCEPUS INFUSCATUS. Kilimanjaro
Bare-throated Francolin.

Several small coveys of this "Spurfowl" were noted on the lower slopes of the range, but did not extend higher up than about 4,500 feet. They were most plentiful in places where old cultivation had been allowed to go back to bush.

I am unable to see any difference between the Chyulu birds and those from the type locality of this race, Lake Jipe.

In view of the recently published opinion regarding this species within Kenya and Uganda, I take this opportunity to draw attention to an undescribed race and to discuss the races of the species as accepted by me.

PTERNISTES LEUCOSCEPUS OLDOWAI. Subsp. Nov.

Grant and Praed have recently reviewed the races of this species (*Ibis*, 1935, pp. 881-883) and recognise only two throughout its entire distribution, Eritrea to Central Tanganyika Territory.

Doubtless many workers on East African ornithology have been surprised at the sweeping way in which names have been synonymised with the race *infuscatus*, type locality Lake Jipe. The reason for this daring action is indicated by a statement on page 882, that the comparative material was only sixty-four specimens representing the species throughout its entire range.

Sclater, in Jackson's book, would accept only one race in Uganda and Kenya, *infuscatus*, thus agreeing with the opinion of Grant as stated above. Recent correspondence with Capt. Grant has elicited the fact that he now recognises a third race, "since our note appeared in the *Ibis*, 1935 (additional material) clearly shows that on general characters a third race may be recognised, i.e. *muhammed-ben-abdullah*, which has the widest distribution in Uganda, and the whole of Kenya except S.W." He limits *infuscatus* to south-western Kenya and Tanganyika Territory.

I have a limited material from the Juba River which is topotypical *mohamed-ben-abdullah*. In my notes on the species, *Birds of Kenya*, Part II, 1925, *Jrl. E.A. & U. Nat. Hist. Soc.*, I admitted this race as extending to Marsabit. I have at the moment no reason to alter this view, and it is for the most part in agreement with the lately expressed views of Grant, cited above. I still suggest the retention of *takora*, Stoneham, for the birds to the west and S.W. of Rudolf. Of *infuscatus*, Lake Jipe area, I have a good series, and it would appear that this race extends northward to the highlands of Kenya. As expressed in

my previous paper *op. cit.* we are unable to deal satisfactorily with the assessing of the value of named forms or races, such as *keniensis*, Mearns, until much more material has been assembled. I have already expressed the view that the material available to Grant was insufficient to form a conclusive opinion, and in view of the fact that Sclater utilised the same material and came to a different opinion as to values, strengthens my view. Nevertheless I have no hesitation in adding yet another racial name to the species as we find it in the area of Oldowai in Tanganyika Territory. This area appears to have been omitted in the range of any described species, except in the general wide distribution given for *infuscatus* by Grant, viz. Tanganyika Territory as far south as the Central Railway. The Oldowai area is to the west of the "Highlands of the Great Craters," N.E. Tanganyika Territory, i.e. N.W. of Mbulu and south of the Tanganyika Serengetti. In this region we find a race which is described as follows:

Underside, predominant colour white with sparse triangular chestnut marks on feathers of flanks, with greyish and chestnut margins enclosing white triangles on the breast feathers; ashy-brown on the crown greyer than in other races; hind-neck equally white and ashy-brown; mantle, scapulars, and long inner secondaries without any solid white central lines, these being broken up into two wavy broken streaks; the secondaries, rump, and rectrices paler ashy-grey with wavy lines and vermiculations in whitish. The dorsum thus shows a pattern associated with the juvenile or sub-adult stages of other races, but here it is retained in very old birds. The secondary and major wing-coverts are widely edged with dirty-white. The general aspect is of a pale race with very white underside.

Type male, Oldowai, 2/12/36, Cambridge Expdt., Oldowai. Dr. Leakey-Bell Coll. now in Coryndon Museum. Paratypes, similar in colouration, six. Obtained from several coveys in the district.

Remarks: A specimen of this race was sent to Grant, who remarks, "Your one bird being whiter below, less marked, is rather aberrant." It is not aberrant for the area cited, and is thus described as a distinct race.

* Further correspondence with Capt. Grant has elicited the fact that he is now prepared to recognise a further race—*Kilimensis*, Mearns (Mr. Kilimanjaro), with a range N.W. and S.W. of that mountain to as far as the Central Railway.

FRANCOLINUS SQUAMATUS CHYULUENSIS. Sub-sp. Nov.

Messrs. Grant and Praed have recently reviewed the races of the *squamatus* group of Francolins (*Ibis*, 1936) and suggest that the race *schuetti* is the one that ranges (so far as the area I am now dealing with) through Uganda and western Kenya Colony, synonymising with it *dawashanus* (Amala river) and *zappeyi* (east shore of Lake Victoria). By "western Kenya Colony" it would appear that they include the central Kenya Highlands east of the Rift, including Mt. Kenya, thus embracing within *schuetti*, the race *keniensis*, Mearns.

The authors do not refer to this racial name in the list of synonyms of *schuetti*; neither is it mentioned in Jackson's "Birds of Kenya and Uganda, Vol. I."

From the series available to me now, it would appear that my suggestion in Nov. Zool., 1922, p. 27, that some of Mearn's names would have to be adopted is strengthened.

Where Grant and I would appear to differ is in his acceptance of *schuetti* for all birds extending through Uganda, crossing the Rift and passing as far east as Mt. Kenya. I accept the Rift as the dividing line between *keniensis*, Mearns, and *zappeyi*, Mearns (antedating *dawashanus*, Madaraz). Grant would restrict the name *maranensis* to the birds inhabiting Kilimanjaro, but to me, it would have been more understandable if he had suggested that *maranensis* extended north, to the Kenya highlands east of the Rift to Mt. Kenya, for birds from Mt. Kenya district, and the Kikuyu country are of the same brownish tone above, and have more or less the same coalescing colouration on the underside as in Kilimanjaro birds. This distribution seems to be indicated by Moreau's remarks on page 866, P.Z.S., 1936. This same writer directs attention to the fact that birds from Mt. Meru, west of Kilimanjaro, are not similar to the Kilimanjaro birds and places them as near *dawashanus*. He further observes that south of Kilimanjaro, the race *usambarae* exists. I now suggest that the race on the Chyulu Range, north-east of Kilimanjaro, is not *maranensis* for the reasons I give later. Referring to the recently published work "Birds of Kenya and Uganda," Jackson, edited by Sclater, 1938, we find it stated that the race *maranensis* extends north to Mt. Kenya and the highlands east of the Rift, and *zappeyi*, west of the Rift, and through Uganda.

One further reference: When Granvik suggests the name *dawashanus* (Rev. Zool. Bot. Afr., p. 14) as applicable to the birds east of the Rift, he is surely in error, as the type locality Engare Dawash (Amala River) is west of the Rift.

DESCRIPTION OF THE CHYULU RACE.

Nearest geographically to the race *maranensis*, Mearns, of Kilimanjaro, the Chyulu birds are very much darker above, less brown tinged, the centres of the mantle feathers and wing coverts being almost black with the lateral margins faintly greyish. This race is more blackish than any of the Kenya forms. On the underside the centres of the feathers are very dark brown-black contrasting very strongly with the marginal whitish; the dark central area is carried quite a long way up the central rib. The upper breast is very dark, due to a widening out of the central blackish area; the neck colouring is equally black and white, this speckling being carried up to the cheeks and lores; the throat is white. There is a superficial resemblance between this race and birds from the Amala-Sotik-Mau area, but the latter are not nearly so dark above. They are distinct from the race *usambarae* with which I have compared them. When seen in the field, they give one the impression of an almost black bird with black and white necks and underside. Thirteen specimens of this new race were taken on the Chyulu Range at altitudes of 5,500-7,000 feet.

Type, male, Chyulu Mts. 6,500 feet, 16/7/38. Coryndon Museum Expedition, 1938. Distribution: Limited to the Chyulu Range. Examples of this new race were submitted to Capt. Grant, who writes as follows: "Your pair of *F. squamatus* are unquestionably a new race and from an area where, I believe, *F. squamatus* has not been recorded.

The races and distributions of *F. squamatus* within Kenya and Uganda and immediate neighbourhood which I uphold are as follows:—

- F. s. maranensis*, Mearns, Kilimanjaro (type locality Marangu on Kilimanjaro).
- F. s. usambarae*, Con., Usambara Mts. (type locality Magambe, Usambara).
- F. s. chyuluensis*, van. Som., Chyulu Range (type locality, upper zone of that range).
- F. s. zappeyi*, Mearns, Amala-Sotik-Mau, to Kaimosi, Kakamega (type locality, east shore Lake Victoria). With this I unite *dawashanus*, Mad. Amala River, antedated by *zappeyi*. It is unfortunate that no more exact locality than "east shore" was given.
- F. s. keniensis*, Mearns, Mt. Kenya, Fort Hall, Kikuyu, Nairobi, and Aberdares (type locality, Mt. Kenya).
- F. s. schuetti*, Cab., Uganda, east to Mt. Elgon and north Kavirondo, meeting with *zappeyi* here.

FRANCOLINUS AFRICANUS MACARTHURI, van Som.
Chyulu Grey-wing Francolin.

The species *F. africanus* has hitherto been recorded in Kenya as represented by one race, *uluensis*. During the course of an ecological survey of the isolated Chyulu Range, by the staff of the Coryndon Museum, Nairobi, a series of this Francolin was obtained. When the first specimens were shot, it was at once noticed that they differed from examples of this species from the mid-Kenya savannah and parklands, and a series was obtained to test the constancy of this difference.

The original description has appeared in the B.B.O.C., Vol. LIX, Nov., 1938. Typical examples of this race are to be found only on the range which is in effect an "inselberg" rising to 7,200 feet from the surrounding plains of 2,000-3,000 feet. They were found only on the moorland zones at 5,500-7,000 feet and represent a dark montane race. They were met with in pairs or small coveys of 4-5, and lie very close, allowing one to approach to within a yard or so before they would get up and disappear in several directions. Their presence was usually made known by their distinctive call—uttered shortly after sunrise or late in the evening.

DESCRIPTION:

A race of *F. africanus*, geographically nearest to *uluensis* of the mid-Kenya savannah and parkland (type locality Machakos), but differing from this in being generally darker above, the dark centres to the feathers of the crown, the spotting of the neck, the dark areas to the mantle feathers, scapulars and secondaries being black, instead of blackish-brown; the dark markings and cross-bars below, which are carried on to the abdomen and under-tail coverts, are black; the chestnut of the breast and flanks is darker. The wing-coverts are greyer and more distinctly barred. The black spotting of the neck is more distinct and plentiful and in some of the females the spots extend up toward the chin, as in the race *psilolaemus* of Shoa.

The race *uluensis* has been recorded from Taveta, and in the Tanganyika Serengeti. I have no specimens from the former and an examination of these birds should be made to ascertain to what degree they approach this montane form. The birds from Apis Rock to the west of the "Highland of the Great Craters" and just northward, at Pussumuru toward the Kenya-Tanganyika border, are not typical *uluensis* and exhibit characters which approach the Chyulu birds, especially on the under-side.

FRANCOLINUS SEPHANAE nr. GRANTI. Red-legged Bush
Francolin.

The Red-legged Bush Francolin was scarce on the hills and as a result an insufficient number were obtained to make any satisfactory comparison.

Such birds as were noted were always below the 5,000 feet level, in the scattered bush country on the lower lava flows.

RALLIDAE. SAROTHRURA.

SAROTHRURA ELEGANS ? LORINGI. Buff-spotted Pigmy
Crake.

As was to be expected, Rails and Crakes were almost entirely absent from the range. There is no free water in the whole thirty miles of their length (apart from water held up in hollow trees and dew), indeed the only water is at the one small drip toward the north end. Nevertheless one knows that certain of the small crakes of the genus *Sarothrura* are not infrequently met with in rank grass where no free water exists. We were thus fortunate in obtaining a single male of the *elegans* group in the "Mbuga" near the Great Chyulu Forest. With the exception of *Sarothrura pulchra centralis*, which is almost entirely a forest bird, these crakes are exceedingly difficult to secure. One may flush them unexpectedly and after a very short flight they drop and simply disappear. One may hunt for hours in the vicinity where they have pitched and one won't find them again. A dog is occasionally successful in flushing them a second time. If one is aware of their presence in a given stretch of grass land or forest it is best to secure them with snares set in artificial runs made in several directions.

Taxonomic Notes on SAROTHRURA CRAKES.

Praed and Grant made a survey of the *Sarothrura* Crakes and published their results in the *Ibis*, 1937. The *elegans* group dealt with on page 632 is divided into two races, the nominate from Durban, and *reichenovi* of Cameroons. All other described races are synonymised with the nominate form. In *lit* dated 8/9/38, Grant now informs me "that *reichenovi* is a synonym" of *elegans*; in other words there is only one race throughout the range of the species in Africa. (The authors claim the same for *S. rufa*; one race throughout Africa.)

Are the birds then migratory, or do they merely move from one feeding ground to another (if associated with temporary water pans, as these dry up)? What are the habitats of the various species? Published data is meagre.

In the summary, the authors suggest that the species have a much wider range and distribution than was at one time supposed and that some, or all of them, are subject to local migration. It would have been of great utility in demonstrating these two points if they had tabulated the localities from which each species or supposed races had been obtained, the time of year when the birds had been taken, and further the general environment and altitude of each. To emphasise these points I append such information as I have, from material at my immediate disposal, and published records applicable to Kenya and Uganda. I have adopted the general classification advocated by Praed and Grant, though I do not thereby necessarily agree with their opinions regarding races.

I should like to record here that the specimen of *elegans* obtained on the Chyulu Range is jet-black in ground colour on the upperside and flanks; the buff spotting is not so large as in Uganda and Kaimosi birds. Wings 85 mm. If we accept the views of the authors, then *languens*, Friedmann, from Tanganyika; *loringi*, Mearns, from Mt. Kenya; *reichenovi*, Sharpe, from Cameroons; *buryi* Og. Grant, British Somaliland, all become synonyms of the nominate South African race *elegans* of Durban.

I am not aware as to how the authors interpret the expression "local migration" as used on page 633, but if by this they merely mean a local movement from one feeding ground to another as suitable swamps dry up (presuming the species has this kind of habitat) then I am prepared to support the suggestion of movement. If, on the other hand, it is a movement within Africa for breeding purposes, then my data will supply a little information on the point.

Species.	Locality.	Alt. ft.	Date.	Environment.	Adults and/or Juveniles.
Eastern Africa:					
<i>S. ELEGANS</i> (In my collection)	Kyetume, Uganda Kaimosi, N. Kavirondo Nairobi Ngong Chyulu Range	4,000 4,740 5,600 5,800 6,000	February February and April May June July	Long grass away from water Swamp grass River margin in grass Grass-land Grass near forest; no surface water	Male, adult Males, adults breed- ing, testes large. Male, adult, in breed- ing cond. Female, adult. Male, adult
Published records:					
(Loveridge) (Loveridge) (Moreau)	Kaimosi Uluguru Sigi valley	4,740 5,000 1,500	February May April	Swamp-grass Near forest edge. Grass-land	Male, adult Female. Female, ovaries slightly enlarged. Female.
(Mearns)	W. side Mt. Kenya	8,500	October	Bamboo	
NOTE.—No records for six months, but breeding birds obtained April-May.					
<i>S. PULCHRA</i> <i>centralis</i> (In my collection)	Uganda, Budongo, Bugoma, Mabira, Buuvuma Isls. Mubango, Lugalambo Kyetume Kaimosi, N. Kav.	3,560- 4,500	January February September October November December March April May	Forest " " " Forest and swamp	15 Adult males. 8 Adult females, Juveniles in March and September. 6 males, adult, 5 females, adult. 1 juvenile.
(Loveridge)	Sesse Islands Budongo Kaimosi	3,400	July May February	Forest Forest Forest	1 male, 1 female. 2 males, adult. Males.
NOTE.—Apparently resident; breeding February, September.					

Species.	Locality.	Alt. ft.	Date.	Environment.	Adults and/or juveniles.
<i>S. RUFA</i> . My collection	Kyetume	4,000	February	Forest stream	Male, adult.
	Mpumu	4,000	June	Stream edge	Male, adult.
	Kisumu	3,600	March	Forest stream	2 males, adult.
	Kiamosi, N.	4,740	March, April, May	Forest stream and swamp	16 males, adult. 8 females, adult.
	Kavirondo				Breeding; eggs.
	Yala River	4,700	October, November	River margin	3 males, adult. 3 females, adult.
	Nairobi	5,600	June	River margin	Male, adult.
	Kyambu	5,800	June	Swamp	Male, adult.
	Kaimosi	4,740	February	River swamp	Males and females.
	Amani	3,000	April	Dense low grass near marsh	Male, adult.
NOTE.—Would appear to be resident; breeding April, May.					
<i>S. BOHMI</i> . My collection	Kisumu	3,500	May	Temporary swamp	Male adult in full breeding; very large testes.
	Nairobi	5,600	July	River margin	Male, adult.
	Machakos	5,100	August	Temporary swamp	Female.
NOTE.—This species definitely breeds in Kenya.					
<i>S. LINEATA</i> <i>Antonii</i> (Meinertzhagen) (Stoneham)	Mt. Kenya	11,500- 12,100	February August	Montane swamp	Males, females.
	Aberdares	11,100	May and June.	Savannah	Females and eggs, males noted.
	Trans-Nzoia				
NOTE.—Would appear to be resident, and breeds in Kenya.					

COLUMBIDAE.

COLUMBA ARQUATRIX ARQUATRIX.

Speckled Forest Pigeon.

Throughout the whole of our stay on the Chyulu Range, extending over a period of nearly four months, these birds were present in hundreds. It was not that they were congregated in large flocks in any one patch of forest, but more or less evenly distributed. At each of our principal camps several pairs were noted to have a more or less set daily routine. They were one of the first birds to bestir themselves at dawn. Their distinctive call could be heard just as the first streaks of daylight showed above the horizon. By 7-30 a.m. they had gathered together and as a flock they flew down the slopes of the hill to an old cedar tree above the water drip. If no one was about they dropped down to the water in twos and threes, then back to the tree until all had drunk their fill. A brief rest, and the flock flew back to the forest and then split up. This flight was again repeated between 5-30 and 6 p.m. At Camp 3 (when our water supply was very low indeed, and water had to be carried about 15 miles), by observing the regular line of flight of these birds to a certain patch of forest some 2,000 feet below the camp, we were able to locate a small collection of water of roughly 20 gallons in an old *Cussonia* tree. It was one of the features of early morning to watch these birds and hear the swish of their wings as they took the downward slope at a terrific speed. They appeared to literally hurl themselves from the treetops and down the steep slope. Their "braking power" was a sight well worth observation. Examination of stomachs showed that they fed largely on the small fruits of *Rapania* and *Cornus* and also *Trema*, obtained from the upper, hill forests, and on olives which could only be from the lower plains forests on the lava flows at 3,500-4,000 feet.

In the twelve birds obtained, there is considerable variation in the amount of white spotting and in the degree of greyness to white on the occiput.

STREPTOPELIA SEMITORQUATA SEMITORQUATA

≧ MINOR.

Grey-vented Dove.

This species was only met with at the northern end where numbers were seen in the vicinity of the old cultivations; a few frequented recently burnt land at 5,600 feet. A young bird newly from the nest was obtained on May 18th.

TYMPANISTRIA TYMPANISTRIA FRASERI.

White-breasted Forest Dove.

A few examples of this species were noted in the underbush of the forests, but the majority frequented the drier patches of

the smaller forest clumps, 5,600 feet, but the species was more plentiful in the old cultivations where bush growth had grown up into an impenetrable mass.

APLOPELIA LARVATA ? KILIMENSIS. Cinnamon-breasted Dove.

This species was abundant in the Great Chyulu forest and to a lesser degree in the forests of the central portion of the range. One noted several of them in a day's tramp through the forest, but after traverses had been cut in various directions they were much more observable. Thus of an evening as one walked along a mile stretch of forest path, at least a dozen pairs could be put up along the clearing. In no other forest in Kenya have I found the species so common. It is for the most part terrestrial and on being flushed will fly up into the mid-strata to drop again when one had either passed on or remained quiet.

The floor of the Chyulu forests is eminently suitable to these birds, for they appear to favour ground which is damp and covered with a thick layer of leaf-mould. It is in such surroundings that their chief food abounds; small mollusca and coleopterous larvae, wood lice, etc. They also eat a certain amount of small berries which are taken from the ground. Another type of food frequently recovered from the stomachs was a small bulbous root which I have been unable to identify. In captivity these Doves will take small grain, but to keep them in condition one has to supplement this with grated cheese and mashed hard-boiled egg.

The breeding season was well over by the end of April, and such young birds as were noted were unattended by their parents.

TAXONOMIC NOTE: I have placed the Chyulu birds with a query as the race *kilimensis*, Neumann. Although this name has been synonymised with that of the nominate race, all the Chyulu birds, some 16 in number are very much darker than any material from the Kenya highlands: 12 skins. It is possible of course that the Kilimanjaro bird may differ from Chyulu ones, and that the former may agree with the nominate race, but a series from Kilimanjaro would have to be compared before this point can be decided. Wings 145-155 mm.

VINAGO CALVA BREVICERA.

Green Fruit Pigeon.

Fairly numerous in those forests where a small fruited parasite *Ficus* was in bearing. They were more often heard than seen. Two Kilimanjaro birds have quite a wash of green on the tail suggestive of possible intergrades with *wakefieldi*, and all the Chyulu birds have a wash of greenish on the outer edges of the rectrices.

MUSOPHAGIDAE.

TURACUS HARTLAUBI HARTLAUBI. Hartlaub's Blue-crested Plantain-Eater.

A very common species in all the larger forests on the Range, particularly the southern end; in the north, one occasionally heard it, but the forests in this area are rather small and contain very few fruit-bearing trees. On the evidence of a long series from the Chyulus and Kilimanjaro, it would appear that *medius*, Mearns, holds good for birds east of the Rift, from Machakos northward; the Chyulu birds belong to the nominate race.

MEROPIDAE.

MELITTOPHAGUS PUSILLUS CYANOSTICTUS.

Kenya Blue-eyebrowed Bee-Eater

All along the lower lava flows this species was noted in small flocks or companies; two pairs were observed at the edge of the great forest at 7,000 feet, but the bulk of the birds did not range above 6,000 feet. Several tunnels in which the birds had evidently nested recently were noted near the water drip at Camp 1 and a few more were noted on the western side in an eroded donga.

MEROPS APIASTER.

European Bee-Eater.

Large flocks of these birds were noted as passing over the Range at Camp 1, moving in a northerly direction (3rd week of April) at about 4 p.m.

ALCEDINIDAE.

HALCYON CHELICUTI CHELICUTI. Striped Kingfisher.

A few Kingfishers were noted on the hillsides at between 4,000-5,000 feet. They spent most of the time hunting from the tops of the *Erythrina* trees, dropping down on grasshoppers and other insects in the grass below. One bird was seen catching a small red-bellied skink and swallowing it.

CUCULIDAE.

CEUTHMOCHARES AEREUS AUSTRALIS. Green yellow-billed Caucal.

A single specimen of this race was recovered at 4,000 feet on the eastern side of the range. No others were seen or heard.

LAMPROMORPHA KLAASI. White-bellied Emerald Cuckoo.

Cuckoos were poorly represented on the Chyulu Range. This species was seen on many occasions in the more open forest patches, and one young bird was heard as it was being fed by a Yellow-vented Bulbul. There is not the slightest doubt that on occasion, adults of Klaas' cuckoo will feed the young of their own species. I have noted this twice, and the same has been seen by my son, and furthermore has been also noted by Moreau.

CHRYSOCOCCYX CUPREUS CUPREUS. Yellow-bellied
Emerald Cuckoo.

No specimens were obtained but the species was heard on more than one occasion during April-July. I should like to take this opportunity of recording the fact that a young of this species was reared in the grounds of the Museum this year, by a pair of *Pycnonotus t. fayi* and fed almost exclusively on the berries of *Erythrococca rigidifolia*.

I had the birds under observation throughout the day from 6 a.m. to 6 p.m. for several days and practically no insects were taken.

CENTROPUS SUPERCILIOSUS FURVUS. Hackled-neck
Caucal.

Common in the grasslands and bush of the lower levels. Seven specimens were obtained; none have wing measurements over 155 mm.; the majority are 153 mm. I am satisfied that the coastal birds and those of the immediate hinterland are smaller than highland and Uganda birds, and therefore retain the name *furvus*. This is contrary to the views expressed in Jackson's Birds of Kenya

TROGONIDAE.

APALODERMA NARINA NARINA \supseteq LITTORALIS.
Chyulu Trogon.

It was surprising to me to find that this species was not met with in any of the high forests except that of the southern end, in the Great Chyulu Forest, 6,000-7,200 feet. Even here it was very scarce for during a two months' collecting in the area, only some half dozen birds were noted. On the other hand, I had noted several pairs in the low mixed forest at 3,500 feet between Noka and the lower lava flows on the Italweni track.

I examined the stomach contents of the birds procured and found them to consist of several species of insects such as

Coccinellid beetles, Pentatomid and Coreid bugs, Ichneumon flies, Diptera, and what interested me most of all, two almost full-grown larvæ of *Charaxes fulvescens acuminatus*; of these one was intact, the other was identified by the complete head-mask.

I have placed these birds as intermediate between the small coastal race and the inland highland form. Two males have wings of 127 mm., one sub-adult male 129 mm.

BUCEROTIDAE.

LOPHOCEROS MELANOLEUCOS SUAHELICUS.

Red-billed Pied Hornbill.

Hornbills of all species were extremely scarce on the range, thus during the three months only one specimen of *suaelicus* was seen and obtained. It was in a small valley forest at 6,000 feet. The species was extremely plentiful in the savannah forests on the plains at 3,500 feet.

In the Great Chyulu Forest a small flock of BYCANISTES CRISTATUS was heard and located but no specimens were obtained as the position they took up was at that time without a traverse, and it was impossible to come up to the birds.

CAPRIMULGIDAE.

CAPRIMULGUS POLIOCEPHALUS PALMQUISTI.

Kilimanjaro White-tail Nightjar.

Here and there where there were slight exposures of lava in the grass lands of the hill sides, one would put up these Nightjars during the day. At dusk, many flew around the camp fire and caught up insects as they were disturbed by movements of the "boys" through the grass and bush. I noted only this one species, and they were most in evidence at the southern end of the range, but were by no means plentiful. One occasionally heard them "churring" but as the breeding season was over they were on the whole silent.

I am satisfied as to the distinctness of these birds when compared with the race of the north-central Kenya highlands.

MICROPIDAE.

MICROPUS AEQUATORIALIS.

Kilimanjaro Giant Swift.

Although not actually shot on the Chyulu range, these birds were noted to pass over in large flocks at about 9 a.m. from the direction of Kilimanjaro. I obtained the series now under consideration at an artificial dam on the Masongoleni-Noka-Italweni track.

When we first visited this water we noted hundreds of these birds circling overhead and after a time they came in bunches swooping down to the surface of the water, just touching it, then wheeling around would repeat the manoeuvre several times and then make off over the wooded plains. The time was then about 10 a.m. On our first visit I had no gun and returned to the spot next day, arriving about 9 a.m. No birds were in evidence except *M. affinis*. By 10 a.m., the first batch of birds arrived and wheeled around the dam at about 200 feet. They did not start to fly over the water until their numbers had been considerably increased, and then one heard an intermittent swish of wings as batch by batch they swooped down the valley, touching the water at about its mid-line and rising parallel to the dam face they wheeled about at a terrific pace. For many minutes I sat and enjoyed the wonderful sight of these master fliers at exercise and taking water. In about half an hour hundreds of birds were taking part in the flight. One heard a constant "fruuu" as, in dozens, they touched water. On the previous day we had noted a few *M. melba*, but on the second day none were in evidence, although I waited for more than two hours for their arrival.

TAXONOMIC NOTE: Several races of these giant Swifts have been described and in nearly every case doubt has been expressed as to their validity. Six specimens from Naivasha-Nakuru-Nairobi area are uniform ashy-brown from crown to rump with a slight greenish wash on the mantle; the undersides vary as to the degree of dark and white mottling. The five Chyulu-Noka birds are very much darker with a strong greeny-black gloss from crown to rump; the undersides are darker, whilst the throats are whiter. These birds have smaller wings: 186-198 mm. as against the former 205-208 mm.

HIRUNDINIDAE.

HIRUNDO RUSTICA RUSTICA.

European Swallow.

During the first part of our stay on the range, these Swallows were numerous for a few days. The last birds were noted on the evening of April 25th. Only two specimens were shot; one has the underside strongly washed with pink-buff and might pass as the race *transitiva*, the other is almost white below.

PSALIDOPROCNE ALBICEPS.

White-headed Sand-Martin.

A few pairs of this little Martin were resident at the north end of the range and were nesting during April-May. One pair had built in the bank above the "water drip." One could see the beard-lichen nest at the end of a short tunnel of eight inches,

by means of reflected light. Two fresh eggs were noted. Another nest constructed in a slight wash-out in a bank contained two young.

The birds were exceedingly tame and flew in and out of their nest hole while the porters were actually drawing water a few feet away.

The female of this nest was caught on the nest by a porter and brought into camp, much to my annoyance, so I took the bird back and released it; within a very short time she had recovered sufficiently from her fright to return to the nest. Strict orders were given that she was to be left alone. Unfortunately, she was shot two weeks after by a new arrival in camp.

UPUPIDAE.

UPUPA AFRICANA.

African Hoopoe.

A somewhat rare bird on the range, but plentiful in the plains country below. Two pairs were noted at the 4,000-5,000 foot level amongst the bush and *Erythrina* on the lower lava slopes. They were not noted at the southern end of the hills.

PHOENICULIDAE.

RHINOPOMASTUS CYANOMELAS SCHALOWI.

East African Scimitar-bill Hoopoe.

Toward the north and central portions of the hills one noted these birds on the lower levels at 4,000-5,000 feet on both eastern and western slopes. They were seen in pairs or small flocks hunting over the lichen-clad branches of the *Erythrina* trees.

STRIGIDAE.

TYTO ALBA AFFINIS.

African Barn Owl.

At night one heard the unmistakable call of the Barn Owl from the forest behind the camp, but it was some considerable time before specimens were obtained. One occasionally saw them flying silently past the tents just after dark but it was not until we reached Camp 2 that any attempt was made to procure specimens. At this camp we found them common and, whereas rodents had been rather scarce at the north end, here we found them to be numerous, and owls correspondingly plentiful. At Camp 3 they were more numerous still and numbers could have been obtained had we wished. The Chyulu birds are very strongly grey above, more so than any of the 20 odd with which I have compared them.

There is some variation on the lower surface; two are pure white with small blackish spots; another is buffy below with a tendency to barring on the flanks.

STRIX WOODFORDII NIGRICANTIA. Brown Forest Owl.

The distinctive call of this bird was a feature of the early night at Camp 3, and to a lesser degree at Camp 2. It was neither seen nor heard at Camp 1. The variation in the plumage of these birds has led to the description of several races. There are two phases in the adult plumage as I have proved in captive birds kept under observation for three years on end; one is a brown dress, the other almost black on the mantle. These are not related to sex. Nestlings kept under close scrutiny have taken 18 months to reach a definite intermediate or sub-adult plumage; the full mature plumage is not assumed until two years old. The stomach contents show small rodents and shrews, beetles, long-antennaed grasshoppers (Tettigoniidae). These last move about at night, and if Moreau's birds took this group of grasshoppers, it does not follow that they were taken during the hours of daylight (Cf. P.Z.S., 1936, p. 870).

In addition to the two Owls mentioned above, Grass Owls, *Asio helvola* were not infrequently flushed.

CAPITONIDAE.

POGONIULUS PUSILLUS AFFINIS. Red-fronted Pigmy Barbet.

Wherever there were clumps of *Erythrina* surrounded by bush, as on the lower lava flows, this little Barbet was invariably present. They are most active during the morning and toward the latter part of the afternoon. Their food consists almost entirely of insects, but odd berries are also taken. One may meet with them in pairs or singly, and when engaged in hunting for food their actions are restless. Watching a bird foraging for food shows that a very methodical method is adopted. As a bird enters the one side of a clump of bush it scans all the branches around with a rapid rather jerky movement of the head; hopping amongst the twigs it picks an insect off here and there, and in a very short time it has scoured the entire clump, having gradually worked its way to the far side in so doing. It then flies off to the next clump and repeats the same tactics. During the heat of the day one may just by chance catch a sight of a bird as it sits in some shady spot either motionless or preening itself. At such a time I have noted a bird to sit stationary for more than two hours on end. The nesting hole has a very small opening, just large enough for the bird to squeeze its way in; the tunnel descends almost vertically for about three inches and ends in a chamber of roughly 2½ inches across. As in the case of other Barbets, these birds use their

nesting holes for sleeping quarters. Two of these nests were found in stumps of *Cussonia* in small patches of forest.

TAXONOMIC NOTE.

The type locality of the race *affinis* is Kipini on the Tana River from whence I have topotypical material. Its distribution covers practically the whole of the dry thorn-bush country of Kenya, westward into Tanganyika. It is fairly constant in its type of plumage throughout its range but shows a tendency to darkening on the lower surface as it goes westward, more particularly in the region of the Mara River in the northern portion of the Masai country; and in the reverse direction, toward the Juba River, it becomes paler and smaller. These Juba River birds I have separated under the name *lollsheid*, for the above mentioned reasons. None from the Juba River have wing measurements over 50, with a minimum of 46 mm. The western birds run from 53-58 mm. Claude Grant, *B.B.O.C.*, Vol. lviii, p. 141, does not accept the validity of the Juba race, but in this I think he is in error if we are to accept the 75% convention as a basis. He admits, in this same Journal, p. 119, that the birds of the Juba area run small. *Vide* his remarks regarding *Ind. minor*.

One difficulty is that the type of *affinis* came from an intermediate locality between the small Juba birds and the larger darker south and western Kenya birds; nevertheless my birds from Kipini are large having wings of 58 mm.

Two birds from the Chyulu range have orange red at the base of the rump, a character on which the race *uropygalis* was founded.

TRICHOLAEMA LACRYMOSUM LACRYMOSUM.

Spotted-flank Barbet.

This was the common Barbet of the *Erythrina* bush and the donga or valley forests, and was encountered from 4,000 to 6,000 feet. Occasionally it was found in the smaller forest patches and along the edges of the larger forests. Several of their nest and sleeping holes were located, and these were invariably quite low down, not more than six feet, often as low as three, in the trunk of some dead, or partially dead tree. I have recorded the call note as "quek" repeated several times in succession, but on the whole I found it a rather silent bird.

At our Noka camp, on the way to the southern end of the range, a solitary bird was found excavating a hole in an inclined tree trunk just at the back of our tent. The presence of human

beings in close proximity did not appear to worry the bird, for it continued its laborious task throughout the afternoon until almost dusk. When I examined the half-finished hole by electric torch at about 9 p.m. the bird was in occupation. This species takes insects as well as fruits, and quite a number of stomachs examined contained termites which had been secured by opening up the earth-works on trees.

The breeding season was over by mid-April, and numbers of young in first plumage were noted and secured. In the series of 20 odd birds obtained, eight are young of the season just over. There is no great difference in the plumage compared to that of the adults. Young birds have the median wing-coverts edged with yellowish-green; these in the adult male are somewhat pointed and have a yellowish tip only.

VIRIDIBUCCO LEUCOMYSTAX CHYULU. Subsp. Nov.

White Moustached Pigmy Olive Barbet.

These little Barbets were only met with in the forests at altitudes of 5,600 and 7,000 feet. They were observed in the canopy of the trees and again in the tops of the trees at the edges of the crater forests. The birds met with on the Chyulu range were silent, possibly because the nesting season was well over (April), but in other places I have heard them utter a semi-metallic note which is repeated rapidly.

TAXONOMIC NOTE.—Among the specimens of this species from the Chyulu Range are four adults which I have compared with a series from Sotik (type locality of *leucomystax*), Mau, Nairobi, Meru (Kenya), Elgon, also four from Kilimanjaro.

The Chyulu bird is purer green on the head and mantle and wing edges; they are also more strongly washed with green, less greyish on the underside, whilst the throat is darker, and the abdomen lacks the buffy tone found in typical birds. In the series of 18 birds from the Kenya highlands I cannot match the Chyulu birds and consider them to be a recognisable race.

The type is a male, 14/6/38, Chyulu Mts., 6,000 feet. Coryndon Museum Expedition, 1938. Paratypes three. Wings 56-58 mm. In nominate race 53-58 mm.

I treat this bird as a species distinct from *simplex* for both occur over part of their distribution and appear not to interbreed. I unite with the nominate race, specimens from Kilimanjaro.

LYBIUS LEUCOCEPHALUS SENEX.

White-headed
White-bellied Barbet.

This White-headed Barbet was not uncommon, and numbers were seen and heard on the lower slopes in the vicinity of the old Wakamba plantations. All round these old cultivations were many wild figs, and on these we found the birds to be feeding in numbers. They were also noted as feeding on the ripening bananas.

Several nesting and sleeping holes were noted in the dead branches of the fig trees. As with many other species of Barbets, this bird will make use of old nesting holes for sleeping quarters, and it is no uncommon thing to find, by closing up a nest hole with a butterfly net and then disturbing the roosting birds, that very often half a dozen birds will emerge one after the other. On one occasion I trapped no less than eleven birds from one sleeping hole. Through several seasons this bird has nested in the Museum grounds and on each occasion I have noted that up to four adults will attend the young in one nest-hole. It has been impossible to ascertain whether more than one female has laid eggs in the one nest, or whether the male is polygamous. I doubt if the latter is so, for on many occasions I have found nests at which only one pair were in occupation throughout the whole period. These birds are very noisy and keep up a continuous chatter.

TAXONOMIC NOTE.

It is of interest to note that the race found on the Chyulu Range is *senex*, whereas, as has been often recorded, *albicauda* is the race found on Kilimanjaro and at Taveta, just south-east.

This has led me to examine the whole series of White-headed Barbets in the Museum, and to map out the distribution of each as shown by this material and published records. In my paper published in *Nov. Zool.*, 1922, I placed *senex* as a race of *albicauda* and stated my reasons for so doing. Sclater treats them as species in the "Systema," but places *senex* as a race of *albicauda* in the recently published Jackson's Birds of Kenya and Uganda, 1938. From the extensive material now before me it is suggestive that both *senex* and *albicauda* are geographical representatives of *leucocephalus*.

We have evidence in the young of *senex* to indicate its affinities with *albicauda*, in that the white scapular patch of the adults is only represented by a few white-centred and white-tipped feathers; that the abdomen is strongly greyish or blackish with white central streaks and tips such as we find in the adults of

both *albicauda* and *leucocephalus*; and in many of the young birds the tails are either entirely or strongly blackish, in fact some of the old birds have black feathers amongst the rectrices.

If we examine the young of *albicauda* we find the same thing, viz. that in many the rectrices are entirely or partly black as in *leucocephalus*. And as we know, the scheme of colouration in *albicauda* is similar to that of *leucocephalus*, except that in the latter the tail is black. Nevertheless, some Uganda *leucocephalus* have white feathers in the tail. It is suggestive that we are in reality dealing with one species of which the race *leucocephalus* is the recessive or parental type, with the other two as recent developments, which, in the young in many instances, exhibit reversion to type, which evidence is eliminated as maturity is reached. Such a state of affairs is not without parallel.

Examining now the known distribution of the three, *leucocephalus*, *albicauda*, and *senex*, we find that this conforms to the suggestion of a common ancestry for the three. We find that *leucocephalus* ranges through Uganda, east to Elgon and north Kavirondo; that *albicauda* extends from South Kavirondo, through the Mara and Narok, the north and north-eastern portions of Tanganyika to west of Kilimanjaro and through the Pare gap to Taveta; we find that *senex* ranges from the north and north-east of Mt. Kenya, through the Kikuyu highlands to Ukambani and the south Masai to the Chyulu Range. There is thus a possible contact between the black-bellied *leucocephalus*, and the less black-bellied *albicauda*, and the latter with the white (in maturity) bellied *senex*. I cannot find evidence of overlap of any two, with full maintenance of characteristics of each in the area of overlap. To what extent *leucogaster* and one or two others may come into this "circle" I cannot suggest for want of comparative material. It is a point worth investigating.

For the time being, I would suggest that as *leucocephalus* is the oldest name, it should be applied as the nominate race of the three geographical races. As regards the name *usukumae*, Neum., we find that Granvik, *Jrl. f. Ornith.*, 1923, p. 87, uses it for birds from Kendu Bay, Kavirondo, and as a race of *leucocephalus*. Friedmann, in referring to this, suggests that Granvik is wrong in assuming *usukumae* to be a race of *leucocephalus*. I suggest that Granvik was right, in that I consider the latter to be the nominate race, as indicated above. I further suggest that *usukumae* is the intermediate between *leucocephalus* and *albicauda*, but I am not satisfied that the name can be upheld on the grounds that it does really represent an intermediate aggregate occupying a definite area between two recognisable races, *leucocephalus* and *albicauda*.

Again as regards the name *abbotti*, Richmond, Taveta, I am inclined to suggest that this is an intermediate between *senex* and *albicauda*. If we refer to Sclater in the "Systema" we find he suggests that both *abbotti* and *usukumae* should be synonymised with *albicauda*. Again, Friedmann, op. cit., says definitely they are synonyms. Claude Grant, *Ibis*, 1915, p. 438, suggested that *leucocephalus* will prove to be an immature dress of *senex*. Doubtless he has altered his views since.

Stated briefly, my conclusions are based on the following:

L. leucocephalus: Adults and young are blackish on back and abdomen with white flecking; tails black (occasionally with some white). This I take to be the ancestral race.

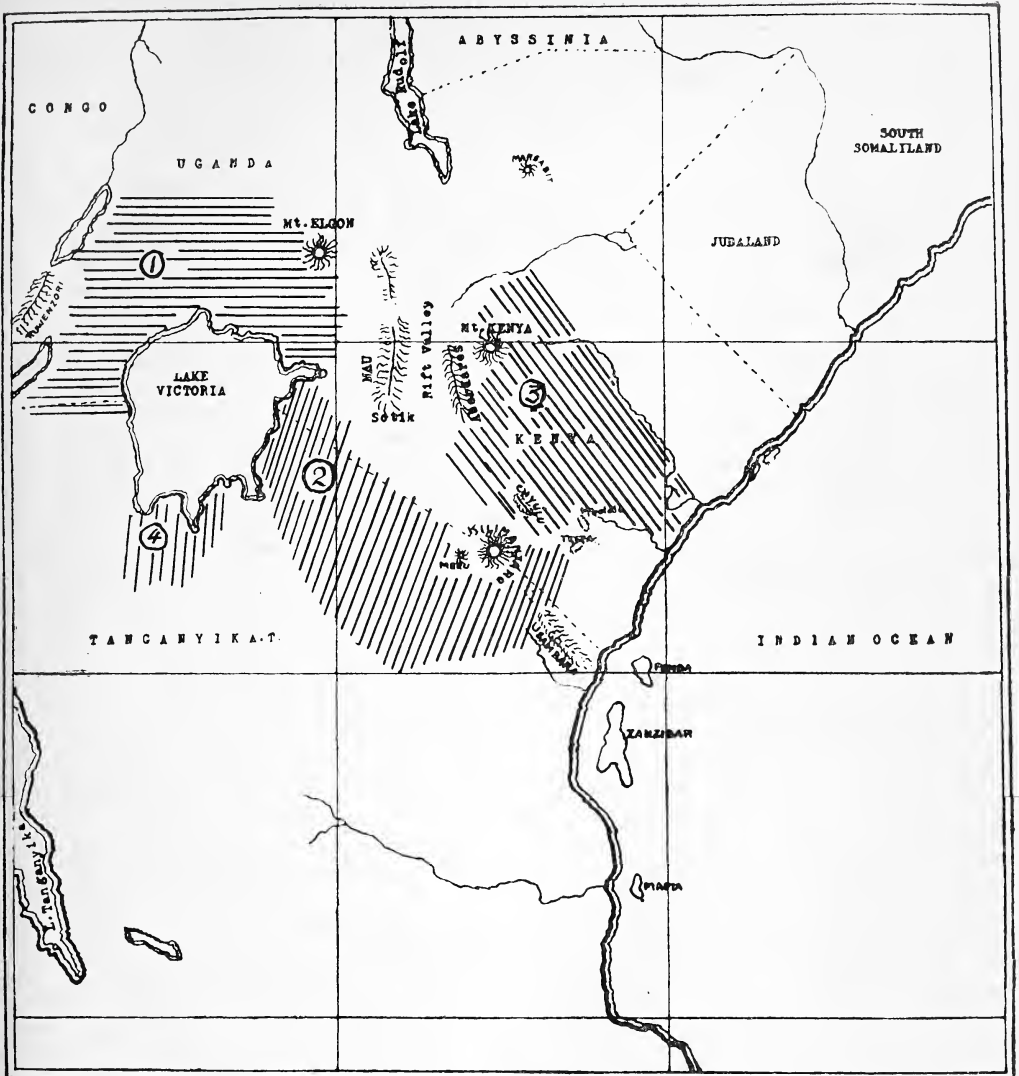
L. leucocephalus albicauda: Adults and young somewhat as in *L. leucocephalus leucocephalus*, but not so black, but with white flecks on abdomen, wing coverts, and inner secondaries; tails white, but often with base of central feathers black, or with two or three black feathers, or, in young birds mostly black with triangular white at tips. This I interpret as a reversion to ancestral type. Such young are shot with adults of normal *albicauda* plumage. The black bases to the rectrices is the main character of the newly described race *leucocephalus lynesii*.

L. leucocephalus senex: Adults without black or just a few black feathers on the abdomen; mantles black with variable degree of white on the scapular region, usually more white in very old birds (this is contrary to Granvik's views, q.v. op. cit., as my series of 11 very old birds have more white than the young and only three have reduced white on the scapulars). Tails usually white, but some with black feathers in the rectrices. On the other hand, the young have blackish tails entirely or partly, and the abdomen is strongly or slightly blackish, and the scapulars and inner secondaries flecked with white, and some have small white central flecks to the tips of the coverts. Again a reversion to ancestral type. Furthermore, one adult has white triangular tips to the inner secondaries and inner greater coverts; further evidence of reversion.

And last of all we have evidence of intermediates in the two supposed races *usukumae* and *abbotti*.

It is to be noted that the Chyulu birds are blacker than birds from the surrounding plains around the type locality of *senex*.

Since writing the above independent observations, my attention has been drawn by Moreau to the paper by Admiral Lynes in *Jrl. f. Ornith.*, 1934, on pages 64 and 65 of which he expresses the view that all are geographical representatives of one (*leucocephalus*) species. In the Editorial footnote, attention is drawn to a paper by Stresemann and Grote, Internat. Kongress, Kopen-



Sketch map showing races of *Lybius leucocephalus* within Kenya and Uganda.

1. *Lybius leucocephalus leucocephalus*.
2. " " *albicauda*.
3. " " *senex*.
4. " " *usukumae*.

hagen, 1926. In acknowledging these prior conclusions, I should like to state that they coincide with my views to a marked degree.

BUCCANODON LEUCOTIS KILIMENSIS. Pied Barbet.

The Pied Barbet was a plentiful species in those parts of the range where fruiting trees, especially figs, were common. In practically all cases, the stomachs examined showed that fig was the most sought-after fruit; this was followed by *Rapania* and *Sapium*. At certain spots one could count as many as fifty individuals, all busy eating the fruit and chattering continuously. Bowen has suggested that this species utters a call note like "ho-ho-ho-" answered by a high-pitched "ha" probably by the female (quoted in Jackson's Birds of Kenya), but this was certainly not my experience, and I had the opportunity of listening to hundreds of them, nor is it Moreau's (in. lit.). In my notes I have likened the call to a frequently repeated "ka-ka-ka-" with an occasional "kak" or "kark" rather long-drawn, or as Moreau puts it, "a squawk." I have elsewhere referred to the likeness of these birds to *Pholia femoralis*, Abbott's Starling, when seen at a distance at the top of a tree, without the aid of glasses. These birds are entirely confined to the forest, and although Moreau does not record it above 6,000 feet, we often met with it at 7,000 on the Chyulu range.

TAXONOMIC NOTE.

In dealing with the very long series of this species from the Chyulu hills, I have taken the opportunity of looking up the references to the race *kenyae*, Bowen.

Sclater, in Jackson's Birds, merely directs attention to it and states that there are no specimens from Kenya in the British Museum. Grant and Praed, *B.B.O.C.*, lviii, 1938, p. 140, are satisfied "that the characters given by Bowen do not hold good," and make *kenyae* a synonym of *kilimensis*. In 1923, I obtained a series from Mt. Kenya, Mau, Embu, Meru, Nanyuki. The former I found to differ from *kilimensis* and submitted them to Dr. Hartert, who replied that some specimens of *kilimensis* had dark rumps. I refrained from separating the Kenya birds. Bowen did so in 1930, using as one of his characters the dark rump. I stated in *Nov. Zool.*, 1932, that I was prepared to accept the race on the usual 75% convention. I now have before me 70 odd specimens from Kilimanjaro and the Chyulu Range. Only three out of the total have the rump dark, the others being white with a very narrow, if any, dark streak. One of the characters which distinguish *kilimensis* from nominate *leucotis* is the white rump.

Although I published my remarks on the Kenya race in 1932, Sclater does not include the localities given, in the Jackson "Birds of Kenya."

The Chyulu material is constantly blacker, especially on the back, and sides on the lower surface and flanks than Kilimanjaro birds. Furthermore, the birds from the low forests at Ganda north of Shimoni, 1,000 feet, are strongly brown, not blackish, on these areas (12 examples), but as these were all taken in one month, I await further material to ascertain if this colouration is constant. This species has been recorded from Nairobi, but although I have collected in this locality for the past twenty odd years I have never seen or heard the bird in that area.

A point to be noted is that the young in first plumage has the sides and the breast, black without any blue glossing.

PICIDAE.

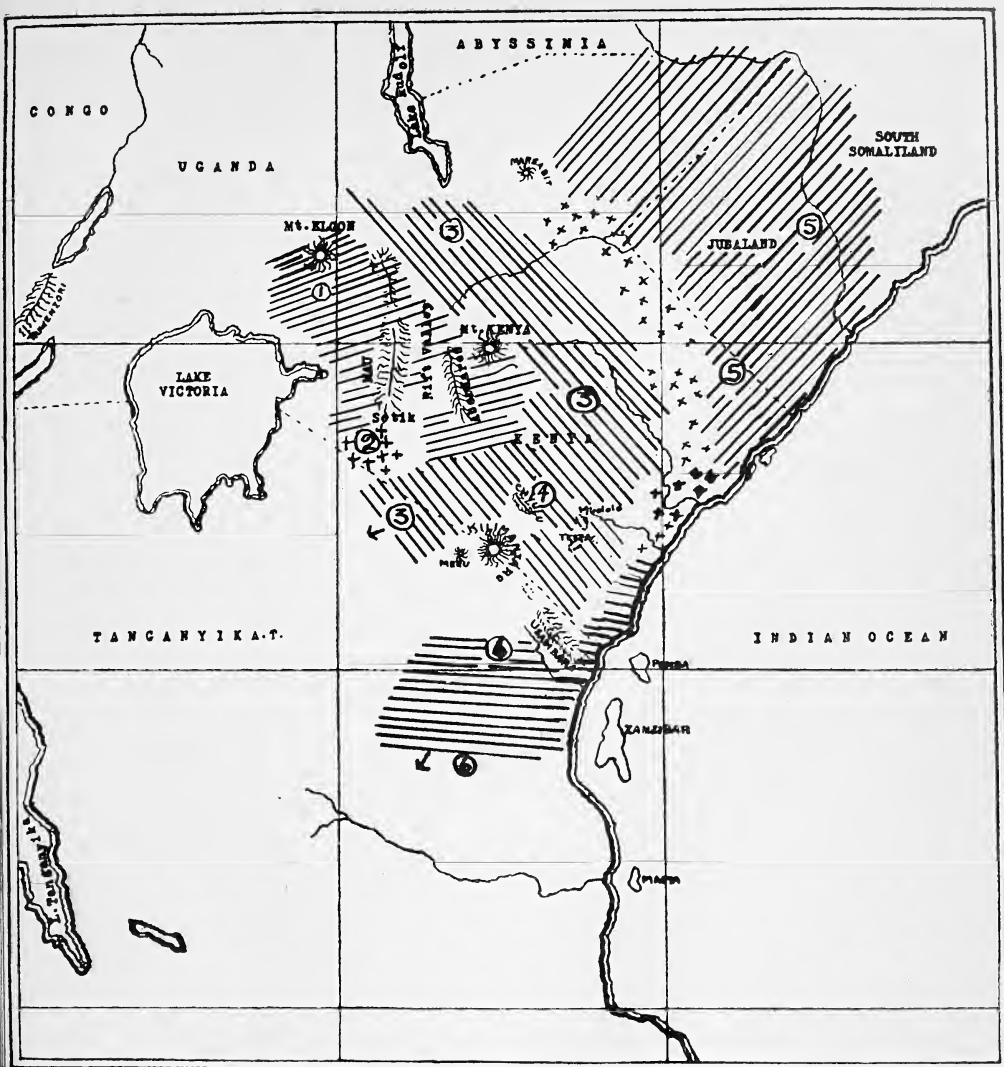
DENDROPICOS FUSCESCENS CHYULU, subsp. nov.

Chyulu Little Barred Woodpecker.

These Woodpeckers were quite numerous along the edges of the forest from 4,500-7,000 feet. One family party of four occupied a hole in a dead *Cussonia* at the back of Camp 1. At Camp 3 they were frequently noticed searching the flowering spikes of the Giant *Lobelia* from which they obtained numbers of spiders. Stomach contents showed that they fed also on beetle larvae, ants, and termites.

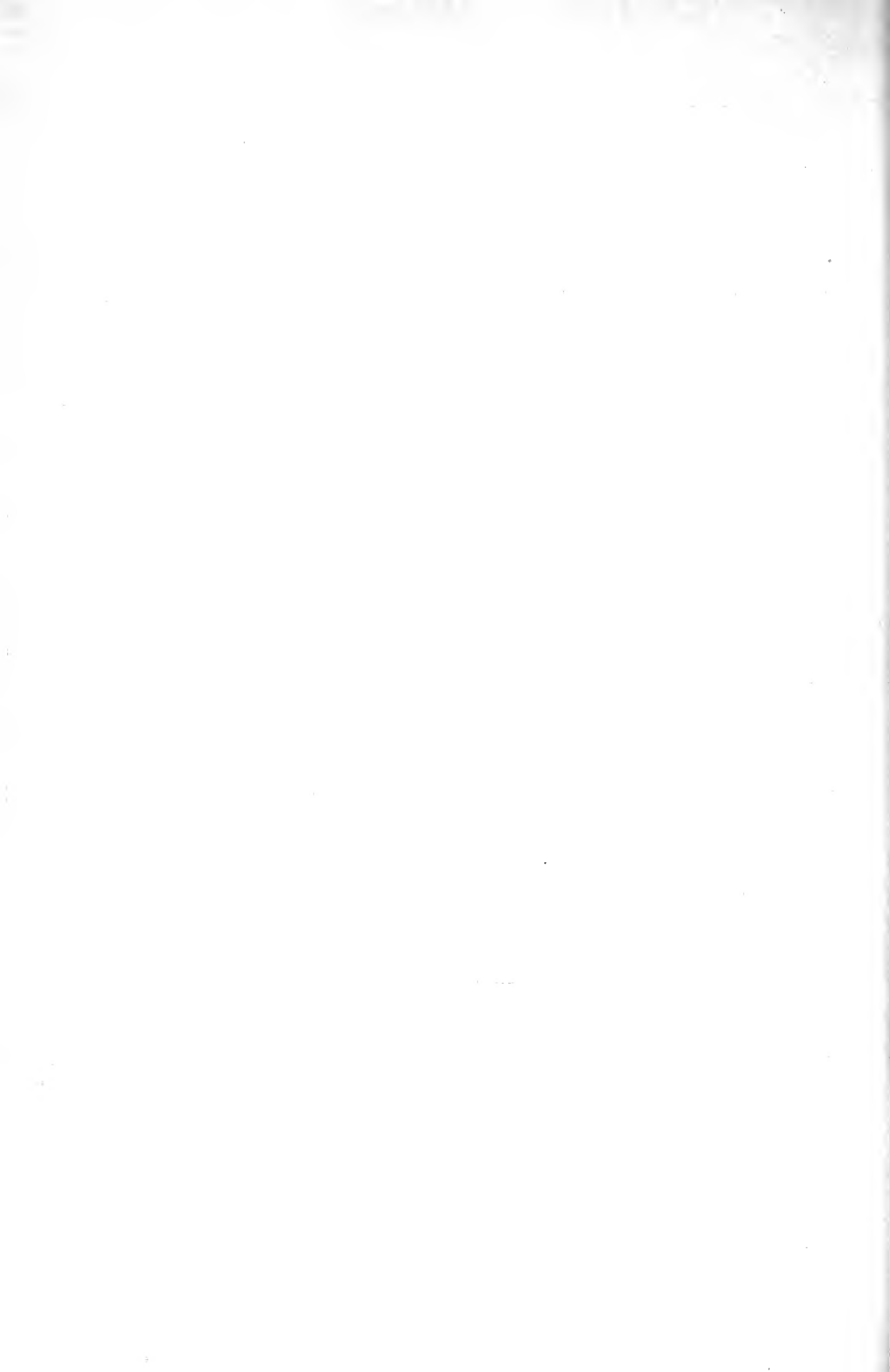
TAXONOMIC NOTE.

The increasing evidence and accumulation of material representing the hitherto accepted species *lafresnayi* and *fuscescens* go to indicate that we are really dealing with only one species, *fuscescens*. I have before me nearly 200 specimens representing the species in its distribution through Uganda and the whole of Kenya, from the Abyssinian border and Juba River to the Kilimanjaro-Usambara line and thence into Tanganyika, Morogoro, Dar-es-Salaam, and Lumbo, P.E.A. Arranging the material geographically, it appears that birds with green backs, uniform or only slightly barred, extend through Uganda to Elgon, through the forest country of the Cherangani, Kakamega, and Mau-Sotik, thence across the Rift to the Aberdares, Kikuyu, and Mt. Kenya. It is at once noticeable that the birds from the Sotik area are becoming barred, in fact some are hardly to be distinguished from the Morogoro bird which is *hartlaubi*, nor from the Usambara birds which also belong to that race. We thus find that



Sketch map showing races of *Dendropicos fuscescens* within Kenya and Uganda.

- | | |
|----|--|
| 1. | <i>Dendropicos fuscescens lepidus.</i> |
| 2. | " " " <i>massaica.</i> |
| 3. | " " " <i>massaica.</i> |
| 4. | " " " <i>chyulu.</i> |
| 5. | " " " <i>hemprichi.</i> |
| 6. | " " " <i>hartlaubi.</i> |



the species, as it extends south from Uganda becomes barred on the back. Assuming the Morogoro-Usambara birds to be *hartlaubi*, and I am assured that they are, we next trace them up along the coast, but how far? Sclater says (*Systema*) not along the coast south of Mombasa. Friedmann says more or less the same. I have in my large coastal series, individuals which, had they a Morogoro label on them, would, on the strength of their colouration, be identified as *hartlaubi* unquestionably. They come from Vanga, Takaungu, and Lamu.

Turning now to the group accepted as *fuscescens*, birds with well marked barring on the back, we first have the race *hemp-richi* which, according to Friedmann, ranges through eastern Abyssinia, south Somaliland, Jubaland, and the Northern Frontier of Kenya. These are represented in my collection by birds from the Juba River, Marsabit, and Archer's Post. The next race is what has been accepted as *massaica*, type locality Ngurumansee. They, according to Friedmann, range from just within the Kenya-Uganda border, Turkana, through the whole of central Kenya to south of Lake Victoria, north-eastern Tanganyika (S.E. Lake Victoria), through Kilimanjaro, Usambara to the Kenya coast. In other words they are said to occupy a considerable tract of Kenya where *lafresnayi lepidus* occurs. I do not know whether he had actual material of *massaica* which can be definitely associated with the area he has shown on his map in which *lepidus* occurs. I have carefully checked my material, and in no place do the two overlap. A passage in Vincent's recent paper, *Ibis*, 1935, p. 20, is pertinent to the matter: "It has been hinted at for years that somewhere *fuscescens* and *lafresnayi* were side by side but where is it? I think the answer is nowhere."

This is not really the correct answer, if by "side by side" Vincent means occupying the same territory and/or running parallel. Let us take for example the Elgon-Turkana area: on Elgon, in the forest we find *lepidus* (my specimens and Granvik's), but outside the forest area in the bush and acacia we get the barred-back *massaica*. Note then that there is an ecological change in environment, vegetational, and altitudinal. The same applies to birds from Cherangani: *lepidus* in forest, *massaica* in the Suk plains. Again *lepidus* in the forests of Mau and Kericho, Sotik, and *massaica* in the savannah forest and acacia country. Again, in the forests of Nairobi and Kiambu, *lepidus*; in the Ukamba country to the south *massaica*. In the Usambara—what has been called—*hartlaubi*, in the high and moderate rainfall areas: to the north of the Uмба steppe, *massaica*. But in this last case, with the change from forest to savannah and steppe forest we find *hartlaubi* is strongly barred

on the back, and indeed where this race merges into the coastal *massaica*, some of the birds are difficult to assign to a specified race.

A glance at the accompanying map will show the distribution as represented by my material. It appears reasonable that we are dealing with one species, so far as the evidence of East African birds are concerned. The foregoing is my independent view.

Here again, Moreau has drawn my attention to Lynes's paper in *J. f. Ornith.*, 1934, on page 69 of which he suggests exactly what I have written. Grant (in lit.) 5/10/38 agrees that there is only the one species, *fuscescens*, with so many races.

Comparing the Chyulu birds of 4,500 and 7,000 foot edge of forest with *massaica* and *hartlaubi* we find them to be definitely different. The ground colour is darker, blacker so that the white barring is in more contrast, yet the dorsum is that of a darker bird than *massaica*, and with very much less greenish-yellow and yellow wash than *hartlaubi*. The streaking on the breast is stronger.

There is greater difference between these Chyulu birds and *massaica* than between the latter and *hemprichi*.

Type: Male, 19/5/38, Chyulu Range, 6,000 feet. Coryndon Museum Expedition, 1938. Paratypes 4 males, 4 females, 3 sub-adults.

CAMPOThERA NUBICA NEUMANNI \supseteq PALLIDA.

Red-headed Spotted Woodpecker.

There were a few examples of this species to be noted along the range but they were few and far between and limited to the lower slopes where *Erythrina* and *Cussonia* were the dominant trees of the lava flows, 4,000-5,000 feet. In the specimens obtained, there is an indication of intermediate characters between two races. I retain the name *neumanni* for the large Kenya Highland birds, for with further material the view is strengthened that they do run larger than northern birds, i.e. we have a greater preponderance of large birds of 114-116 mm. in wing length, in the Kenya Highlands. Birds which have small white spots on the head are always immature, or juveniles of both sexes.

INDICATORIDAE.

INDICATOR INDICATOR.

Common Honey-guide.

Although very common all along the route from Kibwezi to the hills, this species was scarce on the range. It was seen at and obtained in the *Erythrina* clumps on the east and western lava flows at 4,500 and 5,000 feet. During the time of our visit,

many of the M'kamba bee-boxes were being emptied of their honey and at each spot two or three birds were noted.

INDICATOR VARIEGATUS VARIEGATUS. Speckled
Honey-guide.

This species is also represented in the collection: they occurred in similar localities to the large species and also in the smaller forest patches where some of the *Cussonia* trees had bee-workings in holes in the stems. 4,000-5,000 feet.

TAXONOMIC NOTE.

Among the birds collected on the Chyulu Range were examples of this species. This has led me to look up Grant and Praed in *B.B.O.C.*, lviii, 1938, p. 118, and compare it with the views expressed in Jackson's book (Sclater), 1938, and Sclater in *Systema*; *Av. Aeth.* and Sclater, *B.B.O.C.*, 1922, pp. 60-61; and Neumann, 1908.

Starting off with Grant and Praed, we find these authors state the type locality of the nominate race as Knysna, followed by an assertion that *jubaensis* must be considered a synonym of the nominate race. Sclater in *B.B.O.C.*, 1922, states that he examined no specimens of *jubaensis* (presumably there were none in the British Museum or in the Jackson collection). As Grant does not say that he has examined such birds, we can presume that he, too, had no specimens in support of his assertion. He has arrived at his conclusions in a rather curious way. Starting with Neumann's statement that *jubaensis* has wings of 97-103, and finding that some South African and P.E. African birds run to 103 and 101 (it is not mentioned how many out of the series, nor the series), the opinion is expressed that *jubaensis* becomes a synonym. No reference is made to my remarks in *Nov. Zool.*, 1932, nor the measurements of the long series therein mentioned. Kenya, inland Highlands, 108-115 mm. Coastal belt to Juba River, 100-105 mm. The Chyulu birds are 104-105. They would have been more convincing if the measurements of the entire series had been given so that one could judge of the number having such small wing proportions as say the Kenya coastal and Jubaland birds. What of the 75% convention?

Through the kindness of Dr. Austin Roberts, I am able to give the measurements of South African material.

Males.—Knysna: 111-113 mm. East London: 115 mm. Durban: 108 mm. Zululand: 109-112 mm. Transvaal: 111 mm.

Females.—Grahamstown: 105-107 mm. Beira: 105 mm.

Sclater ("Systema") admits *jubaensis*. In Jackson's book, he includes it; in 1922, he admits it but has examined no speci-

mens. I think Grant and Praed are premature in sinking this name.

INDICATOR MINOR.

Lesser Honeyguide.

This species was numerous especially in the more open forests and amongst the *Erythrina* patches, 4,500-6,500 feet. One bird was secured near the edge of the great forest where some of our porters were smoking out a bees' nest.

TAXONOMIC NOTE.

Grant has recently stated, *B.B.O.C.*, 1938, p. 119, that the race *teitensis*, Neum., is untenable. It is admitted by Sclater in Jackson's Birds of Kenya. In *Nov. Zool.*, 1922, I suggested that if the races are separable on size only, it would appear that no great reliance could be placed on this character. I gave a series of wing measurement of series from the coast up to Lake Rudolf, grouping them according to general colouration.

The Chyulu Expedition secured eight more specimens and as the Chyulu Range is within the "terra typica" of *teitensis* (recognising that we are dealing with a somewhat nomadic species not restricted to any one type of country, as my series shows), and they give the following wing measurements: Males, 85, 86, 87, 88. Females, 84, 85.

The material loaned by me to Grant and referred to by him, with additional material since collected, give the following: Kenya Highlands, Aberdares, Nairobi, Kyambu, Kikuyu: Males, 91, 91, 93, 93, 93, 95, 98 mm. Females, 86, 87 mm. Kilimanjaro: Male, 91. Female, 86mm. Lake Victoria area: Males, 93, 96, 96 mm. Female, 92 mm. Rudolf area: Males, 86, 86 mm. Females, 85, 85, 85, 83 mm. Kenya Coast: Males, 83, 87 mm.

From the above data it will be noted that the largest birds are from the Kenya Highlands, Kilimanjaro to Lake Victoria. The Coastal birds are smaller, as are the birds from Lake Rudolf area. These latter show an approach to *diadematus*.

Two birds from the Yala-Kaimosi forest are much more golden above and much darker grey below than any others. Two of the Chyulu birds are strongly washed with green all over the underside; they are sub-adult.

INDICATOR MINOR ERLANGERI.

Grant does not deal with this race under the races of *minor* op. cit., but discusses it on page 141 under *exilis*.

I think he rightly places it in the *minor* group, but surely he disposes of the name in a very casual way. Because Zedlitz gave the wing measurements as 80-84, and Grant finds that in the aggregate of what he takes to be *minor minor* the minimum is

81 (? female), he states that the name *erlangeri* cannot be upheld. On page 119, Grant mentions one of my birds from Unsi, Juba River as having wings of 76 mm. It is a female, and also from this river there was a male of 80 mm. which he does not mention. There is also a bird from Lugh with wings of 76 mm. Referring to the bird of 76 mm. he says "There is no doubt that it is *I. minor minor*. This is in keeping with the known fact that birds from the lower and middle Juba River area run small in size, though they are seldom so constant as to be recognisable as good races." I am not satisfied that he is right in this last statement nor yet that the Juba birds are *minor minor*.

It would appear that apart from my two birds which he examined, he had no further material from this area. The Juba birds are paler above and below than *minor minor* and I uphold the race *erlangeri*.

PRODOTISCUS REGULUS REGULUS.

Brown Pigmy
Honeyguide.

A solitary bird was noted in the *Erythrina* trees below Camp 2 at 5,000 feet and was secured. It was the only specimen of this species observed throughout the range. Its stomach contained a mass of Coccids which had been removed from a *Loranthus* parasitic on the *Erythrina*.

COLIIDAE.

COLIUS STRIATUS CHYULU. Subsp. Nov.

Chyulu Coly,
or Mouse Bird.

The Colies of the Chyulu hills, unlike the birds of Nairobi and Mombasa, were extremely shy, and one could seldom come near them. They were plentiful all along the range, and were most numerous on the western side at the 5,000-6,000 foot level, and extended up to the higher forests of 7,000 feet. These birds were definitely associated with the forests, for on many occasions I noted them feeding on fruit-bearing trees in the middle of forests of 20 acres in extent. At other times one would note them in the smaller patches, but invariably they came to the bigger forests to roost. It was at this time, just about sunset, that one was able to secure a sufficient series. During the day, one might hear the birds in a particular clump of trees and perhaps see a few on the outer branches, but as soon as one approached, the birds dropped into the thick trees and made their way towards the off side. The call of the Chyulu birds, though somewhat similar to that of the coast or inland, has a distinctive intonation.

Dissection of stomachs showed that the birds fed largely on figs, *Lantana*, *Rapania*, shoots of *Catha edulis*, and fruits of Jasmin. An occasional insect was also found. These birds were associated in groups of six to as many as twenty in a bunch, and could be considered as common. About 16 specimens were collected so as to ascertain by series what position they held in regard to the distribution of the races of this widely spread species.

TAXONOMIC NOTE.

In order to ascertain the position of these birds from the Chyulu Range, I have arranged in series all the material available representing the distribution of the races of this species from the coastal belt of Eastern Africa (Dar-es-Salaam to the Juba River), inland to Marsabit and Lake Rudolf and Uganda, some 235 specimens, represented by series throughout.

In considering the possible position of the Chyulu birds we may eliminate, as comparable, *C. s. affinis*, type locality Dar-es-Salaam, so also *C. s. mombassicus*, type locality Changamwe. In *affinis* the throat is grey with no black, and the head and mantle are without barring. In *mombassicus*, the head is greyer than *affinis*, as is also the mantle; the latter is barred, and the underside darker. There are also other differences which need not be detailed here. We may also eliminate the inland race *kikuyuensis*, *ugandensis* (*jebelensis* ?) as well as *marsabit*. These are darker, more brownish birds with very black throats. We are then left with the birds from the Usambaras, Kilimanjaro, Mt. Meru, and Oldowai, the country just north of the Ngurumans, Mara River, and Sotik. In other words, with the birds on either side of the Kenya-Tanganyika boundary line.

I find the Usambara birds to be intermediates between the race *mombassicus* and a race found on the Chyulu Hills, and quite distinct from a further race at the south of Mt. Kilimanjaro at Marangu which will be referred to later. The relationship toward *mombassicus* is indicated by the general type of the throat-upper-breast barring, but the general tone of the upper side is greyer, and the mantle barring is not so distinct. In the type of throat patch they show an approach to *affinis*, but are much nearer to *mombassicus*. The greyish tone to the brown upper side appears to show influence of *cinerascens* (Irangi) from due west, but they are not to be confused with that race. They do indeed approach very near to the Chyulu birds but differ from them in that the throats are not nearly so dark. In the Usambara birds the eyes are brown. The indications then are, that the Usambara birds are an intermediate aggregate with tendencies toward *mombassicus*, *affinis*, and *chyulu*, which is now described.

DESCRIPTION: Nearest to *cinerascens*, but differing from that race by being less pure greyish on the crown and mantle, wings and tail, which are only slightly more greyish than the Usambara birds, but differing from these latter by having a much blacker throat, strongly barred upper breast but paler undersides. Associated with these birds are specimens from North Kilimanjaro and Mt. Meru, which show an undoubted tendency towards *cinerascens*, being more greyish than Chyulu birds but not as grey as *cinerascens*. Furthermore, they have brown eyes like *chyulu*, not yellow or cream as in *cinerascens*.

Type: Male, Chyulu Range, 5,500 feet, 23/5/38, Coryndon Museum Expedition, 1938. Paratypes twelve. Altitude range, 4,500-7,000 feet. Distribution: Chyulu Mountains, and on north Kilimanjaro at Ngare Rongai, and Mt. Meru.

Through the kindness of Mr. Moreau, I have been able to examine specimens from Mbulu and Monduli, and I associate with these, birds from Oldowai. They are characterised by a decidedly grey crown and mantle, wings, and tail; eyes cream or yellow. These are *cinerascens*, Neum., type locality Irangi.

Birds to the north of the Ngurumans, at Psumuru, north to Mara, Sotik, and Kericho, show an affinity toward *cinerascens* and *kikuyuensis*; they are intergrades between these two.

I propose now to revert to the birds of south Kilimanjaro taken at Moshi and Marangu. They differ from the birds of the Usambaras, Chyulu, and north Kilimanjaro by being very much browner on the head, mantle, wing, and tail, darker brown on the underside, and the eyes are yellow. From the brown race *kikuyuensis*, they differ in being less dark brown, and paler on the belly. COLIUS S. MARANGU. Subsp. n.

Type: Male, Marangu, south Kilimanjaro, 9/8/20, in my collection; six paratypes. Distribution: South Kilimanjaro, Moshi, and Marangu.

The views I have herein expressed are in no way contrary to those already published in Nov. Zool., 1922 and 1932; rather do they substantiate and amplify them in accordance with additional material now available. The birds recorded as *affinis* in Jackson's book, 1938, edited by Sclater, are not typical of this race. I do not consider that *affinis* enters Kenya at all.

EURYLAEEMIDAE.

SMITHORNIS CAPENSIS.

Chyulu Broadbill.

This bird was apparently very rare, for although a sharp lookout for it was kept throughout the three months we were on the hills only two specimens were shot. I did not hear the call of this bird and so cannot contrast it with that of the Nairobi

race *medianus*. The Chyulu birds are not so streaked with black on the underside, in fact the lines are very sparse, and the amount of greyish and buffy wash of the breast found in *medianus* is absent except for a slight trace of the latter colour.

Usambara birds have been recorded as *medianus* (Ibis, 1932, p. 669), but Stresemann, after comparing them with the type of *suahelicus*, Grote, considers that they should bear that name (Moreau in lit.).

The exact determination of the Chyulu bird must await further material from the range. The Chyulu birds have the streaking on the under side and above, narrower, and less extensive.

ALAUDIDAE.

MIRAFRA FISCHERI.

Flappet Lark.

This characteristic bird of the more open bush and acacia country was the only species of Lark which might be admitted to the bird fauna of the Chyulu hills. It was very plentiful in the country between Kibwezi and the foot of the range at 3,500 feet, but it was not found on the higher elevations of the main ridge. It is of interest to find the bird on the lower lava flows, for on these more or less flat areas, especially the larger ones towards the base of the hills, the vegetation conforms to that type usually associated with the species.

The two specimens taken were at about their highest line of distribution, viz., 4,500 feet. One is in the very dark blackish phase, the other in the dark brown but not rufous-rusty plumage. They were collected on 19/5/18 and 5/6/38.

MOTACILLIDAE.

ANTHUS NICHOLSONI CHYULUENSIS. Chyulu Long-billed Pipit.

Apart from migratory Pipits (*Anthus trivialis*) this was the only species met with on the whole range. It is of interest to note that these birds were always in the vicinity of the forest patches on the higher levels and when flushed, invariably flew to some tree in the forest rather than to some bush in the grassland. I did not record this bird from elevations lower than 4,500 feet and at the same time it ranged to the 7,000 feet level. In the field one at once noted that these birds appeared very much darker than any of this species I had met with elsewhere and for this reason a good series was collected. They are more partial to the short-grass moorlands, where, on account of the very shallow depth of soil, the grass grew to no great height,

rather than to the tall oat-grass slopes. Where this latter had been burnt off and the new grass had assumed no great length one found the birds. They were very timid and most had to be shot as they got up, for had one waited until they rested on the top of a forest tree, the chances were that the bird would not be recovered in the thick growth of the forest margin. The food taken consisted of small mollusca, nymphal grasshoppers, bugs, and termites, and other insects which were indeterminable amongst the stomach debris.

The only call noted was made as the bird was flushed, a double "swi-swi." We found no signs of nesting, but obvious young of the season just over were about.

TAXONOMIC NOTE.

The twelve birds secured by the Museum Expedition to the Chyulu Range are darker than any of the comparative material available, some 30 skins, and this dark colouration is maintained in all stages. If one examines the new feathers of any specimen from the Kenya Highlands, none have the same blackness centrally as the full plumaged Chyulu birds. These, without doubt, are a dark montane race with a limited distribution in the Chyulu Range, for we find that the next geographically is a paler bird. I refer to those birds which are to be met with in the region of Apis Rock about 20 miles north of the Oldowai Gorge, in Tanganyika Territory. This area is a dry one, and not montane, nor is it subjected to mist clouds. The Chyulu birds were located at the edge of mist-forest. Birds from the Kedong Valley through Naivasha, Nakuru, to Mau are only slightly darker than these Oldowai birds; on the other hand, birds which show an approach to the material from Chyulu are to be found in the Marsabit area, but even these are not so dark. The Chyulu birds may be described as follows:

DESCRIPTION: General plumage above from forehead to rump, darker than the race *neumannianus*, Hartert (Nom. nov. for *longirostris*, vide Friedmann, *Bull.*, 153, *U.S. Nat. Mus.*, pp. 251-252), of southern Ethiopia south to Kenya, Rift Valley as far as Lukenia. They are very much darker than birds from Oldowai. The dark portions of the feathers of the mantle, inner secondaries, and wing-coverts and tail blackish with a strong green-blue reflection; breast with spotting more numerous, and distinct. Type: Male, Chyulu hills, 6,000 feet, 4/5/38. Coryndon Museum.

Comparative wing measurements:

Chyulu birds: Males, 95-100 mm.; females, 90-96 mm.

Oldowai: Males, 102-105 mm.; females, 95-97 mm.

Nakuru, Naivasha, Lukenia: Males, 100-102 mm.;
females, 97 mm.
Northern Guasso, Marsabit: Males, 100 mm.; females,
90-92 mm.
Rudolf, S.W.: 89, 92, 98 mm. (unsexed).

Moreau has recorded *longirostris* from Oldeani, south-east of Apis Rock, and notes that this is a southward extension of the range of the bird, from Naivasha, the last recorded locality. In my 1922 paper in *Nov. Zool.*, No. XXIX, I recorded it from Sagala, Teita. These are near the Chyulu race, but are not so dark.

TIMALIIDAE.

TURDOIDES HYPOLEUCA ? Sub-species. Pied or White-bellied Babbler.

This was the only Babbler found on the Chyulu range and was observed to extend from the lower bush and acacia country of 4,000 feet up to the 5,000 foot contour, whereas in the Kibwezi area up to the foot hills one met with *Argya rubiginosa*, but the latter did not ascend the hills. It is not a forest bird but was always found in the small scattered clumps of bush and trees surrounding the *Erythrina* association. These clumps of *Erythrina* colonisation were particularly plentiful on the larger lava flows between the main and lateral series of volcanic cones, and again on the large flow between the south end of Chyulu proper and the Southern Chyulus. In these localities several flocks of *hypoleuca* were located. They were always associated in flocks of four to eight or so and attention was invariably drawn to them by their harsh and persistent cries.

Of the series collected on the Chyulu Range, one is an almost complete albino. There is a certain amount of variation in the series *inter se*, but the series, compared with typical material from Kitui and Machakos to Nairobi, etc., is very much darker than any of these. Comparing fresh plumaged typical birds with birds in similar state from the Chyulu Range, we find the latter to be blacker above from crown to rump, wings, and tail, and the half-breast-band is equally brown-black; the lores and below the eye are black, while the ear-coverts are brown-black streaked with white. Contrasting with the black lores, there is a greyish to white spot in front of the eyes which is carried back as a pale greyish supercillium. Examining the freshly moulted-in feathers of *hypoleuca hypoleuca* we find that they are never as dark as the fresh plumage of Chyulu birds.

A dark race has recently been described by Vincent, B.B.O.C., lv., p. 176, as *T. h. kilosa*. The description applies very

well to these Chyulu birds, but that district is hundreds of miles from the Chyulu Range, and in between we have the race named by Neumann, *rufuensis*, on the grounds of paler dorsal colour (compared to nominate *hypoleuca*), the rump and upper tail-coverts lighter than the back, the forehead light grey and the feathers of the dorsum with pale edges. Ref. Friedmann, *Bull.* 153, U.S. Nat. Mus., 1937.

This race is said to range from Pangani to Kilimanjaro, and is supported by Sjostedt.

PSEUDOALCIPPE ABYSSINICUS CHYULU. Subsp. nov.
Grey-headed Forest Babbler.

A long series of some thirty odd skins was obtained from the great forest at the southern portion of the main range, and a few were taken in its northward extension, but the species was entirely absent from the central and northern drier forests. The altitude variation of the forest areas in which the bird was noted was approximately 5,000-7,000 feet; the undergrowth and the floor of the forest being wet or constantly damp as a result of the heavy mists and dew fall.

Stomach examination of over 20 individuals showed that the diet is a mixed one, consisting of small berries (indeterminable) insects and small molluscs. Most of the insects were in larval form (Noctuid and Geometrids and Coleoptera).

TAXONOMIC NOTE.

The racial forms of this species, so far as Eastern Africa is concerned, present some difficulty. According to Sclater, *Syst. Av. Aethiop.*, p. 364, one racial form extends from Abyssinia to Tanganyika, through Kilimanjaro to the Usambara range.

In 1922, I accepted the name *kilimensis*, Shelley, for the race inhabiting Kilimanjaro, and in 1932, *Nov. Zool.*, p. 341, indicated that there appeared to be a transitional trend in colour toward the Kilimanjaro race, in specimens from South Mau, Aberdares, and Mt. Kenya, the latter according to Sclater being *abyssinicus* of which he made *kilimensis* a synonym. Being aware of the uncertainty of validity of forms, a considerable series (30 odd) was collected on the Chyulus. I am satisfied that these birds are not similar to material from central Kenya Highlands, nor do they agree with Kilimanjaro material; they in fact represent a distinct geographical race.

DESCRIPTION: Compared with birds from Elgeyu, Mau, Aberdares, and Mt. Kenya, they have the crown and nape a purer blue-grey, not ashy-grey; the mantle has a distinct olive tinge as

against the rufescent wash in the northern birds; the tails are darker, less rufescent; the underside is a purer blue-grey, thus the white flecking on the throat and the white in the middle of the abdomen is in greater contrast. Furthermore wing and tail measurements show that the Chyulu birds are smaller.

COMPARATIVE MEASUREMENTS:

	Chyulu birds.		Kenya Highland birds.
	2 birds 64 mm.		4 birds 71 mm.
	6 " 65 mm.		2 " 67 mm.
	3 " 66 mm.		5 " 68 mm.
Wings	11 " 67 mm.	Wings	2 " 69 mm.
	5 " 68 mm.		6 " 70 mm.
	3 " 69 mm.		11 " 71 mm.
Wing average	67 mm.		5 " 72 mm.
Tail average	57 mm.		7 " 73 mm.
			1 " 74 mm.
		Wing average	73 mm.
		Tail average	64 mm.

Because there is an overlap between the maxima of the one and the minima of the other, some might query the status of the Chyulu birds, but taking these measurements along with the definite colour differences, one is justified in recognising a local race. Type, male, Chyulu Camp 3, 5,800 feet, 29/6/38. Coryndon Museum Expedition, 1938. Paratypes 32 specimens.

In 1928 Grote (*Orn. Monatsb.*, 1928, p. 77) described a race from the Usambara range as *micra*. This is relegated to the synonyms of *abyssinicus* by Sclater (*Systema Av.* and Jackson's Birds, 1938). Mr. Moreau has kindly supplied me with material from Pare and Usambara. Wings 66-68 mm., and I have Kilimanjaro birds with wings 66-71 mm. It is a remarkable fact that this material shows no or very slight colour differences to the Kenya Highland birds, thus differing from the Chyulu race, which, because of their isolated range, have become differentiated to a greater degree than have the Usambara birds.

PYCNONOTIDAE.

PYCNONOTUS TRICOLOR CHYULU. Subsp. nov.

Chyulu Yellow-vented Bulbul.

The Yellow-vented Bulbul of the Chyulu range was found at altitudes varying from 4,000-7,000. They were invariably in pairs, or pairs with young just from the nest. In the smaller

patches of forest up to five acres or so these birds were often met with in the canopy of the interior, but for the most part, and certainly in respect to the Great Chyulu forest, they were usually associated with the outer margin where the bulk of their food was to be found. Such nests as were found were in the marginal fringe of woody herbs, *Vernonia* and *Leonotis* mixed with *Lantana*, *Cissus*, and *Celastraceae*. It was usually in the last that the nest was located. These birds are largely frugivorous but quantities of insects are also taken. Stomach contents were examined and found to contain berries of *Rapania*, *Lantana*, Jasmin, Fig, and *Erythrococcus*, together with nymphal forms of grasshoppers and other insects. The call of these birds is hardly to be distinguished from that of the plains race *teitensis*, van Som.; it is perhaps fuller, less high pitched, but the phrasing is identical. In common with others of this group, these birds have a low call "cheedle-lit" as they sidle up to one another (for they are fond of sitting alongside each other), and the song (sic) composed of four notes is like "Chee-chidle-chidle-lit." The only time when these birds were noted in numbers together was in the early morning or in the late afternoon when they congregated round the only water drip at the north end of the range. Here perhaps four or five pairs might be seen, but at the central and southern end no congregating was noted; a sufficiency of water was obtained from the vegetation which held the heavy dew and mist throughout the entire day. As in the highland race, these birds were sociable and two pairs hung around our camp 1, in the vicinity of the "cook-house" and the porters' quarters; when the remains of "posho" and other food debris was thrown out they would help themselves freely, though such diet was actually foreign to them.

TAXONOMIC NOTES.

I was not a little surprised to find that the *Pycnonotus* of the Chyulus was of the "plains" type and not *micrus*, Mearns, associated with Kilimanjaro and the surrounding districts. They are of the speckled-breast, white-neck-spot group more allied to *dodsoni*. The nearest race of this type is *teitensis* (*peasei*), but it is quite obvious that the ecological conditions of the range have given rise to a local race which cannot be united with any of the described forms. The colour of the mantle, back, wings, and tail is very much darker; the entire head is blacker, less brown-black; the ashy breast band is darker while the underside is pure white, thus in greater contrast to the breast band; the vent and under tail-coverts are paler lemon yellow. Under wing-coverts at bend of wing washed with yellow; wing-coverts with distinct yellowish-green on margins.

Type: Male, Chyulu Hills, 6,560 feet, 27/4/38. Coryndon Museum Expedition, 1938.

Thirteen specimens; wings, males, 83-87 mm.; females, 78-82 mm.

I should like to take this opportunity of drawing attention to a misprint in my paper *Nov. Zool.*, XXXVII, 1932, p. 347, where the wing measurements of the various series are dealt with. After *P. tricolor dodsoni*, the word *dodsoni* should be in brackets indicating that the birds are of this type but not that particular race. Thus *P. t. (dodsoni)* from Teita and Tsavo areas are the race *teitensis* referred to above; further, *P. t. (dodsoni)*, Mombasa and coast line, is *littoralis*, also mentioned before. For the present known distribution of the races, refer to the adjoining map.

Friedmann and Loveridge, in dealing with this group of Bulbuls in *Bulletin, Museum of Comp. Zool.*, Vol. 81, No. 1, p. 229, have placed the Kenya coastal birds, or as they put it, "the coastal plain of Southern Kenya Colony," as *micrus*, Mearns. Birds from this area are my *littoralis* and not *micrus*. When dealing with the next race, they state "that altitude is the important factor in the distribution of sub-species in Eastern Africa," and they suggest that the Kenya highland race *fayi* (type loc. Njabini, western Aberdares) is the bird found on Usambara. My first comment is, that the birds of the Chyulu Hills up to 7,000 feet are not *fayi* but are of the speckled-breasted group, nearest to *teitensis* (*Peasei*, Mearns) inclining to *dodsoni*, and are not of the plain-backed-plain-breasted group to which *fayi* belongs. So much for the factor of altitude. My next comment is in connection with the recent treatment of these bulbuls by Friedmann in *Bulletin* 153, United States National Museum. In this review he maintains *dodsoni* and *tricolor* as separate species, and when dealing with the races of the former, unites my *teitensis* with *peasei*, and reverses the opinion of Dr. Oberholser, who dealt with the same comparative material of *peasei* which Friedmann has, and declared that my *teitensis* was distinct from it (*peasei*). Friedmann then, without, as he admits, any material of *littoralis*, makes it a synonym of *peasei*, thus following Sclater in *Systema Avium Aethiopicarum*. I can only quote a passage from a letter from Sclater, after he had examined a series of these bulbuls I had sent him, after publication of his "Systema":

"Your *littoralis* and *teitensis* between them seem to bridge the gulf between *dodsoni* and the *tricolor* group. *Teitensis* must, I think, be the same as Mearns's *peasei*, and does perhaps average a little larger than *dodsoni* proper, but there is a good deal of variation among examples from the



Sketch map showing distribution of races of *P. tricolor* within Kenya and Uganda.

- 1. *Pycnonotus tricolor minor*.
- 2. " " *fayi*.
- 3. " " *micrus*.
- 4. " " *littoralis*.
- 5. " " *dodsoni*.
- 6. " " *peasei (teitensis)*
- 7. " " *chyulu*.
- 8. " " *spurius*.



same neighbourhood and I should not be inclined to recognise a race with so slight a character as a variation of 2 or 3 mm. in wing. Your *littoralis* from Sokoke and Changamwe appears to be distinctly intermediate with *dodsoni* and *micrus* (of which a series was sent from topotypical locs.) on the whole nearer *micrus* as they show hardly any sign of the character of *dodsoni*. I should call them *P. t. micrus dodsoni*, but if you like to give them a separate name, I see no reason why you should not do so."

I quote this extract *in extenso* because the views of Friedmann and Sclater are *not* in agreement. The view now is that they all belong to one species, the intermediates being *peasei* and *littoralis*. We find that Friedmann states that *peasei*, absorbing *littoralis* within that race, extends to the Kenya coast; on the other hand the same author states in *Bulletin*, Museum Comp. Zool. op. cit., p. 229, that *micrus* extends to the Kenya coast. This may be reconcilable if *micrus* is one species and *peasei* another, but if my *littoralis* is the aggregate of interbreeding between *P. dodsoni peasei* and *P. tricolor micrus*, as is suggested by Sclater, then the species *dodsoni* and *tricolor* must be united. In any case, if we assume that the distributions as shown on the map accompanying Friedmann's paper are correct, my very extensive material (250 specimens) show that the race *peasei* (including in this *teitensis*) extends right up to Marsabit, and Lake Koroli, thus cutting right through his distribution of *dodsoni dodsoni*, almost linking with the Abyssinian race *spurius* which he upholds, and Sclater does not. Furthermore, in *Bulletin* 153 cit. in further reference to *littoralis*, he says: "It appears that the birds forming this aggregate are merely intermediates between *peasei* and *dodsoni*, which suggestion is supported both by geography and ecology." I incline to the opinion of Sclater, that they are the aggregate between *dodsoni dodsoni*, including *dodsoni peasei* (which is admissible, and absorbing *teitensis*) and *micrus*, a race of *tricolor*. We thus revert to the suggestion that *dodsoni* and *tricolor* are one species. It is more than obvious that the Kenya coastal birds I have named *littoralis* are not *peasei*, nor are they *micrus*, and they are the birds which upset Friedmann's allocation. Both his and Sclater's remarks suggest a close relationship of *littoralis* to *dodsoni*, and as these birds show characters of both the *dodsoni* and *tricolor* groups, one can only assume them to be of one species. I have already shown that Friedmann's map is not correct so far as the distribution of *peasei* and *dodsoni* are concerned, and I would further suggest that it is inaccurate on the coastal strip also.

ARIZELOCICHLA MILANJENSIS CHYULU, Subsp. Nov.

Chyulu Streaky-cheeked Green Bulbul.

Throughout the entire forested areas of the Chyulu range this bird was plentiful and without exception the commonest of the forest species. It occurred in the lower forests at 4,000 and extended up to the highest point at 7,200 feet. The only types of forest in which I failed to locate it were the remnants of the cedar forests on the lower lava flows. Its distribution within the forests was limited to the canopy and the upper mid-growth thus occupying a different strata to that of *Phyllastrephus*, which was almost entirely confined to the lower-mid and lower zones. The only occasions when the species was noted at lower elevations were in those lesser forest patches where most of the berry-bearing trees grew at the fringe of the forested craters. Reference has been made in the introductory narrative to the formation of the forests in the craters, indicating that at the upper lip, exposed to the strong winds, trees which grew to a great height in the body of the craters were stunted and distorted. Amongst these were the *Rapania*, on the berries of which these Bulbuls feed very largely. The fruits of these fringing trees matured prior to those of the interior and the birds resorted to them to feed. Among the other fruits and berries eaten one noted a small *Ficus*, a *Sapium*, a small smooth yellow fruit (species indet.), and also fruits of *Lantana* and *Jasmin*.

In contradistinction to *Phyllastrephus*, these birds are comparatively silent except when they are feeding; at such times they call to one another, employing three notes like "u-ki-ri" with an occasional trilling note. The "song" (sic) which I have heard them utter, mostly in the early morning and late afternoon is recorded in my notes as "churru-hichu-hichu-hichu-hick," the last note short and high. Like many other bulbuls they also have a "company call" answered by different birds in turn.

When we arrived on the hills, mid-April, the nesting season was over. A few old nests were located and these were, as noted by me previously, as being a somewhat frail structure composed of rootlets and twigs, fern roots for lining, and so thinly constructed that one can look through them. The situation of the nest varies somewhat; often a horizontal fork is selected, at other times an upright fork in a sapling tree, but the construction is always the same. A description of the eggs is taken from my notes on "Bulbuls of Kenya and Uganda," *Nov. Zool.*, 1932: buffy in ground colour, lined and spotted with brown and with submarks of lilac-grey; nestnig at Marangu in January and February; in May at Taveta forest."

Several young birds in nestling plumage were observed and a few secured; some were just from the nest for their tails were

only half grown. In general scheme of colour they resemble the adults but are duller and greyer below. Many of the adults obtained during the first two weeks were in heavy moult, particularly about the head, wings, and tails. A long series of the species was collected throughout the four months up to the end of July.

Sclater, in Jackson's Birds, 1938, suggests that as this species occurs in north-east Tanganyika it might possibly be found in Kenya. Already in 1932 I recorded it from Taveta.

The Museum Expedition secured a very long series from the Chyulu Range much further to the north and well within Kenya boundaries.

The only race of *milanjensis* recorded from Eastern Africa is *striifacies*, Reich. and Neum., described from Marangu on Kilimanjaro (not Chiradzulu, Nyasaland, as stated by Belcher, "Birds of Nyasaland," p. 190). I have a series from this type locality (Marangu) and was surprised to note that the first few specimens collected on the Chyulu Range did not conform to these Kilimanjaro birds; as a result a long series was taken during the three months of our residence on the hills.

DESCRIPTION: The Chyulu birds differ in being clearer olive-green from the forehead to the tip of the tail, not brownish or golden olive green, and the whole of the lower surface is much lighter; the chin being greyish and the throat yellowish. The difference between the two races can be seen at a glance, when the series from the two localities, Marangu and Chyulu, are laid out side by side. The axillaries and under-wing coverts are clearer yellow, as are also the inner webs of the primaries and secondaries.

Type: Male, Chyulu Mts., Camp 3, 7,000 feet, 6/7/38. Coryndon Museum Expedition, 1938.

Comparative wing measurements:

A. *m. striifacies*.—Marangu, 14 specimens, 94-100 mm.; Pare and Usambara, 5 specimens, 94-99 mm.

A. *m. chyulu*.—Chyulu Mts., 98-105 in males, 90-98 mm. in females.

Over 100 specimens taken. Average wing length: Males, 101 mm.; females, 95 mm.

The distribution of this new race is from the Chyulu Range, 5,000-7,000 feet. Specimens from Mt. Mbololo, and the other Teita hills are nearer to the Chyulu birds than to *striifacies*. The specimens recorded by Loveridge from Mbololo, and those taken by Moreau on Teita are of this type. The Coryndon Museum now has a series of twenty specimens from Mt. Mbololo.

The females are slightly duller than males and have a greyish wash on the breast. Immature and nestlings are not so streaked on the ear-coverts and have a strong wash of greyish on the breast and upper abdomen.

ANDROPADUS INSULARIS. Lesser Yellow-bellied Bulbul.

This species was noted as plentiful along the lower forests up to 4,000 feet, but none were observed above this altitude. The incessant call note was one of the features of the forest patches of the lower lava ridges and flows. As no specimens were collected I refrain from indicating its exact race.

PHYLLASTREPHUS FISCHERI CHYULUENSIS. Subsp. Nov.
Chyulu White-throated Bulbul.

This species of Bulbul is an inhabitant of the forests keeping almost entirely to the undergrowth and mid strata. By reason of this fact it was most conspicuous and obtruded itself on one's notice by its chatter and scolding call as one put them up during traverses through the forest. Opportunities for close observation of the bird were afforded by a combination of two factors: the undergrowth in most of the forests consisted of *Piper* growing straight and clean-stemmed so that one could obtain a clear view along the forest floor below their tops, if one squatted, and secondly the inherent curiosity exhibited by the birds. It was an easy thing to attract all the white-throated bulbuls within a radius of a hundred yards by making a squeaking or squealing noise like an animal in pain; within a few moments the birds would appear and hopping about the *Piper* stems in full view, they commenced scolding and flapping their wings and expanding their tails in great excitement. Not only under such circumstances were these birds noisy, but for about an hour before sunset they would chatter and call as they sought the particular spot in the undergrowth where they usually settled down for the night. From the foregoing one must not obtain the idea that the birds went about in flocks, on the contrary, they were usually in pairs, or during the end of the nesting period, in family parties of three to four.

Under ordinary conditions semi-companies might be observed as part of a "hunting party," not in association with the species which were working systematically through the canopy of the forest, but at a lower strata, for even in this zone many insects disturbed from the top would attempt to find shelter in the mid-growth, only to be taken by birds hunting in it. Apart from participating in these "organised drives" as it were, these birds are very methodical in their search for insects which appear to be their staple diet. One can observe them moving

in one direction working the undergrowth, and if a creeper-clad tree is in their path of progress they will ascend the lianas to almost their limit then drop again into the undergrowth. As they hunt they utter a sharp double note like "pru-it, pru-it." If disturbed or excited the call note becomes "pru-it, pru-it, prit. pritprit," or again, a sharp "prip-prip" changing to "prup, prup, prup" varied with a guttural "chirr." The note seems to be forced or explosive, and the call is accompanied by tail flirting and flapping of wings.

Amongst the series collected are all stages from nestlings to adults, but no nests were located. It would appear that here also the nesting season was over by mid-April. A partial moult after nesting seems to take place, for many adults were moulting on the head and body and tail; some few were changing the flight feathers.

TAXONOMIC NOTE.

The species *Phyllastrephus fischeri* has recently been reviewed by Moreau (*B.B.O.C.*, Vol. lvii, pp. 125-127). The author is inclined to associate all birds of this species within Kenya, with the exception of *sucosus* west of the Rift, and the nominate coastal *fischeri*, with *placidus*, type locality Kilimanjaro. He gives as the distribution of *placidus*: Kenya east of the Rift, from Marsabit to Mt. Kenya, the Kenya highlands forests, Kilimanjaro, and south to Nyasaland. He thus includes the race *marsabit* described by me from a series of 10 birds, in 1930. He admits that his comparative material from Marsabit was two birds only. Mr. Moreau has since had the opportunity of examining my series, and while individually no great difference between a single Marsabit specimen and a series of *placidus* from Kilimanjaro can be detected, in series there is a distinct difference in tone, both above and below. Mr. Moreau still thinks it "very close." However, I maintain its validity, the more so, in view of the fact that he associates all birds from Kilimanjaro, Pare, and Usambara with the Kenya highland ones. Grote disagrees with this, and so do I. Vide post. To ascertain whether there was any difference between the Chyulu birds and those from Kilimanjaro and the Kenya highlands forests, I have arranged the birds in three columns (50 skins Chyulu—50 skins Kilimanjaro-Kenya highlands); on two sides Chyulu birds, and in between Kilimanjaro-Kenya material, in four rows. The commencement and the end of the Kilimanjaro-Kenya birds in each row has been indicated immediately by an independent viewer with no knowledge except colour values; furthermore, the Marsabit birds were subsequently indicated in the same way. It is obvious, then, that in a series there are

these colour differences. In seeking to find a name which might be applicable to the Chyulu birds, we have to consider *cognatus*, Grote, founded on birds from Usambara. We have been assured by Moreau that birds from that locality are not separable from Kilimanjaro specimens. Grote's stated difference was that Usambara birds were darker on the sides of the body, more dusty-olive-green as compared with the greyish-olive of Kilimanjaro material. I have had the opportunity of comparing Usambara material, through the kindness of Mr. Moreau. Herr Grote (in. lit.) still maintains his race, and I do so also. The Chyulu race is described as follows: Compared with *placidus*, the upper surface darker, more pure olivaceous, less brownish-olive, the crown is considerably darker olive; the wings and tail are darker, less rusty. The undersurface is paler below than Kilimanjaro-Kenya *placidus* with more white on the lower chest to vent; flanks paler.

Compared with *cognatus*, Grote, the Chyulu birds are darker above, and very much paler below.

Type: Male, Chyulu Mts., Camp 2, 5,800 feet, 28/5/38. Coryndon Museum Expedition, 1938.

A series of 78 specimens were taken during April to July.

Altitude range 5,000-7,200 feet. Wing measurements: Males, 94-86 mm.; 15 over 90, 6 of 89. Females, 75-87 mm.; av. 83 mm.

CHLOROCICHLA FLAVIVENTRIS CHYULUENSIS.

Subsp. Nov.

Chyulu yellow-bellied Bulbul.

Only a few examples of this Bulbul were noted between Camps 2 and 3 at altitudes of 5,000 feet in the undergrowth of the forests. Because the species is common all along the coastal belt and only less so in the highland regions up to 7,000 feet in Kenya, we unfortunately paid insufficient attention to obtaining a long series. Nevertheless such birds as were obtained indicate that on the Chyulu hills these birds are considerably darker than any race within eastern Africa. The Chyulu birds have the same general habits as the other races, that is, they frequent the undergrowth of the forests and are usually seen in pairs or small family parties. Indication of their presence is usually given by the scolding call which they make when disturbed, consisting of three long and three short notes with the sound of "pauw-pauw-pau-pau-pau-pau."

TAXONOMIC NOTE.

Differs from *centralis* of eastern Tanganyika, Loeru, *mombasae*, Shelley of Kenya coast line, and *meruensis*, Mearns, Mt. Kenya, in its considerably darker colour on the upper side, which is a dark olive with little brownish tinge, rather more greyish;

the crown of the head much darker than the mantle, being blackish-olive; the tail is purer-greenish, less brownish. On the underside the yellow is paler, but the breast and flanks are more washed with greyish.

Type: Male, Chyulu Range, 5,000 feet, 23/5/38. Coryndon Museum Expedition, 1938. Wings 103-110 mm. Paratypes, one male and one female. Noted at Camps 2 and 3 at elevations of 5,000-6,800 in the forest undergrowth.

MUSICICAPIDAE.

DIOPTRORNIS FISCHERI, Reichenw.

Fischer's Ring-eyed
Fly-Catcher.

This was by far the commonest Fly-catcher throughout the range and was found from 3,500 to 7,000 feet in, and on the forest margins. Though many times noted within the larger forests, taking part in one of those concerted "drives" in which several species of birds take part, this bird was more often noted along the forest margins, not so much in the fringe of woody herbs as along the edge of the forest trees. In this area they were found in the canopy of the trees where they were noted as feeding largely on berries. When seen on the edges of the forest they were usually "hawking" species of flying ants. None of the birds obtained were sexually active; the nesting season was well over and the young birds in first speckled plumage were unattended by their parents.

Very often, and usually toward the late afternoon, one observed them hunting over the streamers of beardmoss and lichen which festooned the trees along the forest edges; from such places they captured spiders and a few beetles, numbers of small cockroaches, and earwigs. In all cases where stomach contents were examined, there was invariably a good admixture of berries, very often *Erythrococca* and *Rapania*. On two occasions I noted a bird flying out after a Pierine butterfly, *Belenois mesentina*. On the first occasion the butterfly was eaten after the wings had been dislodged, but on the second, the insect was dropped; the rejected one was a female with yellow hind wings, and bears a superficial resemblance to a species of *Mylothris* which was abundant along the forest edges

BRADORNIS PALLIDUS CHYULUENSIS. Subsp. Nov.

Chyulu White-throated Ashy Fly-catcher.

The Ashy Fly-catcher was fairly common on the range and extended from the 4,500 feet contour up to 6,800 feet. It was associated with the edges of the forest and in the lesser commencing forests. It was not found in the interior of the forests.

One usually saw it perched on some exposed twig at the forest edge or on the top of the *Erythrina* trees which were surrounded by secondary growth and forming compact patches of vegetation. The method of securing its prey is either by hawking when ants are not on the wing, or by dropping down on some insect it has detected on the ground. When it alights on the ground it put its tail up and moves it up and down, as it strikes the insect, firmly held in the bill against the ground. In this it resembles to a certain degree *Dioptrornis fischeri*. This bird has been observed flying out after small *Fulgorids* which have been disturbed from the grass.

The species is resident on the range, but the breeding season was over by mid-April (first nesting season). One or two birds show signs of incomplete moult in that the 1st primaries are still in sheath at the base.

TAXONOMIC NOTE.

These birds from the Chyulu Range cannot be united with *B. p. suahelicus*, van Som., of the highlands of Kenya, nor with the smaller *subalaris* of the coastal zone. In size they are nearer to the former, but the darker, more grey of the upper side distinguishes them. The series is uniform in colour and for this reason we cannot unite them with *suahelicus*. They do not belong to the *microrhyncha* group, but are a dark race of the *pallida* association. The white of the throat is clearly defined from the darker colouration of the chest. These birds are not to be confused with *B. taruensis*, van Som., which is a distinct species.

Type: Male, Chyulu Range, 5,000-6,800 feet, 7/6/38. Coryndon Museum Expedition. Paratypes seven.

Remarks: Wing measurements are 99-101 mm. in males, 90-79 mm. in females, thus smaller than in the race *suahelicus*, which give 102-106 mm. and 95-98 mm.

This is yet a further case where the bird fauna of the range of mist differs from that of the surrounding plains and in the same direction, viz., darker yet clearer colouration.

MELAEORNIS PAMMELAINA TROPICALIS, Cab.

Blue-black Flycatcher.

A few examples of this species were noted toward the foot of the range, thus one saw them in deserted plantations at the 3,500 foot level and again at 4,500 feet, but the highest point reached was 6,000 feet at the central portion of the hills. They frequented the solitary *Erythrina* trees or these in association with *Cussonia* and various woody herbs. It was thus a bird of the lower lava flows and the commencing valley forests which

are spreading in the deep scored eastern face of the central portion of the range. The association of this bird with the Drongo of the plantations was of interest.

Two males obtained are in fresh full plumage, while the female in like condition is generally duller, less strongly violet-blue-black. Young birds were noted at 3,500 feet.

ALSEONAX MINIMUS CHYULU. Subsp. Nov. Chyulu Little
Brown Flycatcher.

Wherever we wandered about the range, this little bird was in evidence. At the topmost heights of 7,200 feet to just below 5,000 feet all along the forest edges one met them. They were usually in pairs and each pair seemed to have its particular stretch of the forest edge. It was only when parents were still with young in attendance that more than a pair were noted, in one spot. From early morning to just at dusk these birds flitted about after the minute Diptera and small moths which during the first month of our stay were very numerous on the sheltered side of the forest patches. There were certain large moss laden trees behind our first camp which, after a shower of rain, attracted many species of birds just after five o'clock as the sun's rays beat straight on to them. Most of the birds worked the canopy and the streamers of beard-moss and in doing so disturbed many insects and as these fell or flew downwards, a pair of Brown Flycatchers snapped them up with avidity; the click of their beaks was audible for some distance. These birds are almost without fear of man and one could sit quietly near a bush from which they darted out after passing insects and in so doing many times they came within a foot of one. On one occasion I was sitting in the scrub at the edge of the forest near where a pair of birds hunted; my gun was held upright between my knees and several times either one or other of the birds would alight on the point of the barrels. Because of this sociable trait I forbade any of the species to be shot near our camps. Notwithstanding this order several birds found their way to the skinning table. Another instance of temerity was shown when a pair followed the trail of one of the insect collectors who was beating the bush for beetles, etc. Many small moths were disturbed and as these flew off the Flycatchers with unerring judgment snapped them up. Two nests of this species were found. Both were built in similar surroundings; between the upright fork of a medium-sized tree where a small collection of debris hung down one side. On the top of this and close to the trunk, the nest was built with bark fibres, bits of lichen and moss and lined with a few odd Francolin and Guineafowl feathers. Only young birds were present, probably a late or second brood (May), for

on these hills the nesting season is much earlier than in the Kenya highland areas.

TAXONOMIC NOTE.

When a series of these Chyulu birds are compared with typical material from Kilimanjaro, *murinus*, it is at once evident that the former are much darker on the upperside; a dark-ashy-grey lacking entirely any brownish tinge which is noticeable in *murinus*. In this respect they approach nearer to the race *roehli* of the Usambara, specimens of which I have before me. They are, however, darker than that race and can be distinguished further from it by having a brownish wash over the upper abdomen and flanks. A further point of difference between the Chyulu birds and *murinus* is that the former have pale buffy to pure white throats which contrast strongly with the darker ashy breast band. Out of twenty odd specimens only two show any approach on the underside to *murinus*. I am compelled, therefore, to describe the Chyulu birds as distinct.

Type: Male, Chyulu Range, 5,500-7,200 feet, 14/6/38. Coryndon Museum Expedition, 1938. Paratypes twenty-three.

Remarks: The variation in wing length is as follows: Adults only—males, 62-64 mm.; females, 58-63 mm.

Kilimanjaro *murinus* run to 66 mm. as do also specimens from the Kenya highlands. Moreau, *P.Z.S.*, Jan., 1936, has some remarks to make about these little flycatchers, and states that birds of this group were submitted to Friedmann. Friedmann (in. lit.) is of the opinion that the birds I described as *marsabit* and those of the Kenya highlands, *interpositus*, are "variable intergrades between *murinus* on the south, and *djamjamensis* on the north, Abyssinia, and *pumilus* on the west." Birds from Marsabit cannot be confused with *murinus*, for the reasons stated in the original description, nor can they be considered as anything like the Chyulu birds; the one is very brown, the other almost blackish. *Interpositus* is the intermediate, not so very variable, between *murinus* of Kilimanjaro, and *marsabit* of that mountain. I have already indicated the approach of *chyulu* toward *roehli* and in this connection would remark that birds from Mt. Mbololo are near *roehli*.

BATIS MOLITOR PUELLA.

Chin-spot Puff-backed
Flycatcher.

This was the only species of Puff-backed Flycatcher met with on the Chyulu range. It occurred in the small, less mature forest patches; in the dongas where *Erythrina* had established itself; and along the margins of the larger forests, but was not met with in the Great Chyulu forest of the south end. The

altitude range was 4,500-7,000 on the range proper, but it also occurred on the plains. I never heard these birds utter more than a double note, that is, the two notes which precede the third, so characteristic of the birds of Naivasha and the Nairobi area.

The curious "clipping" of the wings, which makes a sound like "pirip pirip pirup," was often heard when the birds were otherwise silent. I have recorded elsewhere the fact that parent birds with eggs or young will, in an attempt to frighten off an intruder if too close to the nest, snap their bills rapidly and with considerable noise, at the same time "clipping" the wings.

BATIS MOLITOR group, and allied species.

Recent writers (Friedmann and Sclater) have cast doubt on the validity of a small race of *molitor* which I named *taruensis*, which is limited in its distribution to the coastal belt and immediate hinterland. Within its distribution is found *perkeo*. Sclater definitely states that *molitor puella* does not extend to the coastal strip of Kenya. What race then does? The reason for this limitation is obscure, unless it is admitted that my *taruensis* which he suggests is a synonym of *puella* is in reality a valid race, as I maintain.

Sclater further suggests that *soror*, with which he unites *littoralis* of Zanzibar, and *pallidigula* of Lumbo, is a race of *molitor* and that *soror* ranges along the African coast to Zanzibar only, but I have it from the Pangani and Shimba Hills, Kenya.

When I published my paper in *Nov. Zool.*, 1932, I attempted to show that *perkeo*, treated as a species by Neumann, and subsequently as such by Friedmann, *Bull.* 153, U.S. Nat. Mus., p. 240, and placed as a race of *orientalis* by Sclater in his "Systema," had certain definite affinities to *soror*, *littoralis*, and *pallidigula* (assuming for the moment that they are separable), and there is further evidence, in that Neumann has stated that *orientalis* and *perkeo* occur together (ref. Friedmann) so the latter should not be considered a race of the former.

If we examine *perkeo* and *soror* we find that they have the same grey crown; very similar breast band, and whereas in the latter the chin spot is large, in the latter it is "represented by a slight yellowish wash." (cf. Friedmann, op. cit.). Furthermore, we find that the small white line from the base of the bill above the black lores is tinged with yellowish or orange in *soror*, *pallidigula*, and *perkeo*. I have referred to this at length, for I do not wish Friedmann's suggestion on page 241, op. cit., "if van Someren's series of *perkeo* have brown throat spots, they are wrongly identified," to be taken seriously. My series have the throat white or slightly yellowish washed. I do not know where

Friedmann obtained the idea that my birds had brown throat spots.

My views are thus not entirely in agreement with the opinion expressed by Vincent in *Ibis*, 1934.

The race of *molitor* of the Chyulu hills is *puella*.

TROCHOCERCUS BIVITTATUS BIVITTATUS.

Blue-headed White-bellied Crested Flycatcher.

Most numerous in the Chyulu Great Forest this bird was also found in the lesser forests but not those which we have designated as commencing valley forests and *Erythrina* associations.

The altitude range is approximately 5,000-7,000 feet. They were often seen as members of a "drive" in the forest canopy, but when not so engaged were usually observed in the mid- and *Piper* strata. Their presence was at all times made known by their high-pitched call consisting of five or three notes. They are quite one of the most excitable of birds, even more so than *Phyllastrephus*, that we met with. On one occasion at Camp 3 I heard a great commotion in the forest and went to investigate; several species of birds were fluttering excitedly round a clump of *Piper* in which I discovered an African Barn Owl. Most vociferous of all the birds was a pair of *Trochocercus* which darted in and out scolding loudly and between the ferocious attacks they hopped about the branches overhead with quivering wings, outspread tails, and crests raised; the picture of fury. I noted soon after that these birds had a pair of fledglings not far off.

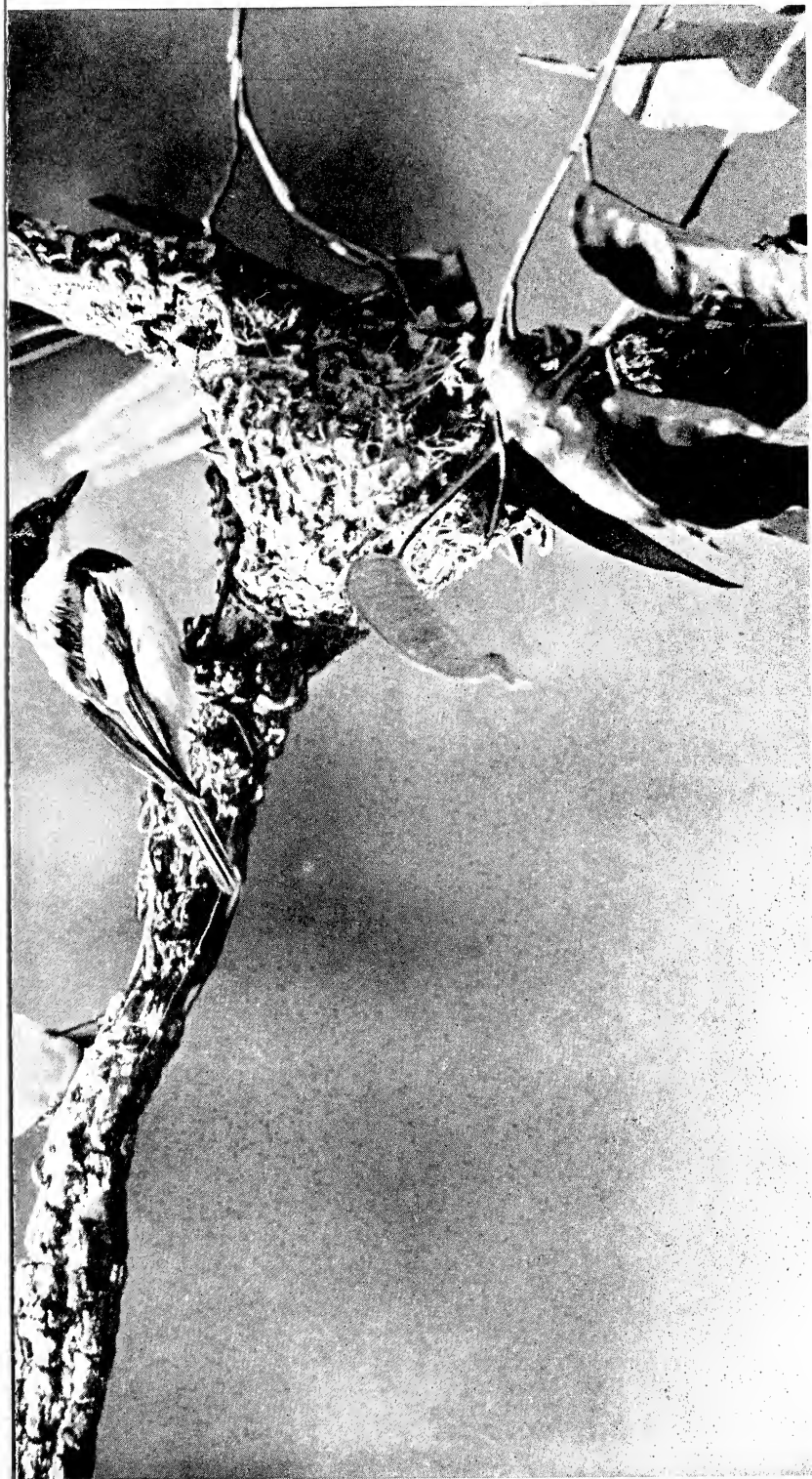
TAXONOMIC NOTE.

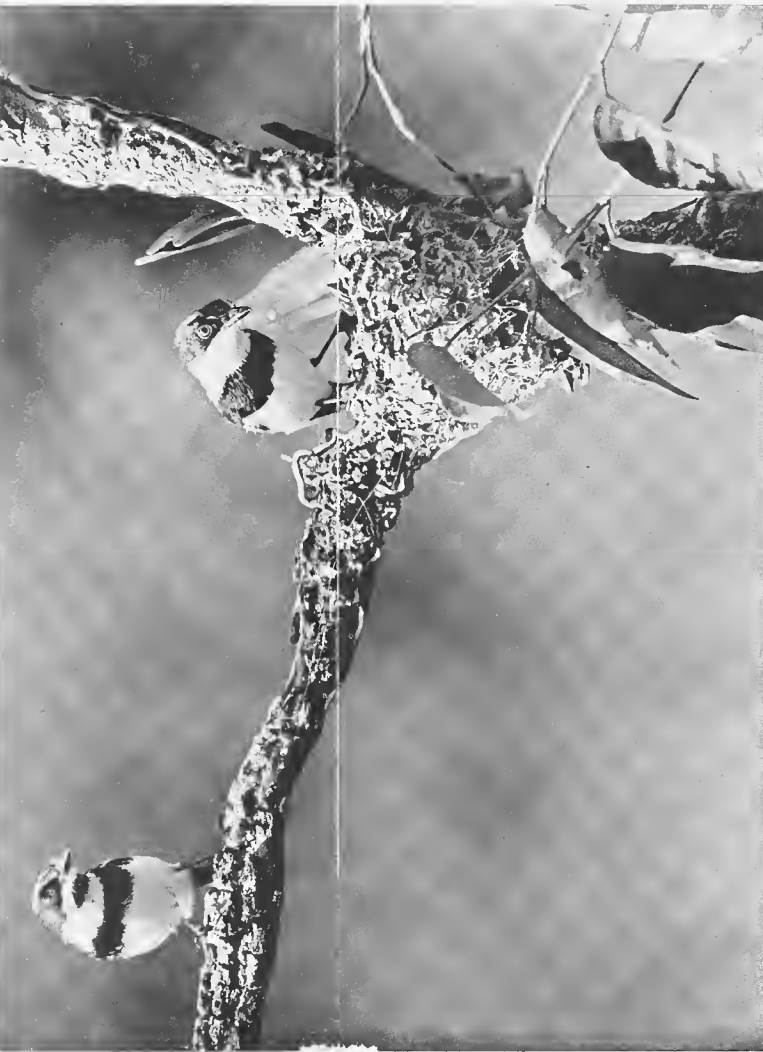
These Chyulu birds are more closely associated with the coastal nominate race than the highland race *kikuyuensis*. In both sexes the colour of the backs and wings are a shade darker than a series from the coast, but in size they agree. Males have wings of 67-70 mm.; females, 65-68 mm. It is thus of interest to note that at 5,000-7,000 feet approximately the altitude of the race *kikuyuensis*, the Chyulu birds retain the characters of the coast race. This is also Moreau's experience as recorded in *Ibis*, 1938, when dealing with Mbulu birds.

CHLOROPETA MASSAICA.

Chyulu Black-headed
Yellow Flycatcher.

Only one species of *Chloropeta* was found on the range. It was noted at 4,500 feet up to nearly 7,000 feet, always along the edge of the forests. Five specimens were obtained. Three are adults in fresh plumage and two in intermediate dress between the nestling and sub-adult dress. These adult birds do not





PUFF-BACK FLYCATCHERS AT NEST. (*Basis moltor vuella*.)

agree with material from Nairobi area and Fort Hall and Kericho, for they have the top of the head olive-black, not olive-brown, and the colour of the mantle and wings more green, less washed with golden.

Various views have been expressed as to the relationship of these dark-headed birds to the plain-headed *similis*. Moreau has noted that both are to be found at the 6,100 foot level (*Ibis*, Jan., 1938, p. 13), and the Chyulu birds as already noted were obtainable at 7,000 feet. I have always considered them to be distinct species and the fact that one does not seem to meet with any intermediates so far as colouration is concerned rather supports this view. I am not satisfied that there is any great ecological difference in their habitats which would bar either the one or the other from overlapping and, if they are really one species, from producing intergrades; such have not been found.

TURDIDAE.

TURDUS OLIVACEUS CHYULUENSIS. Subsp. Nov.

Chyulu Orange-billed Thrush.

The orange-billed Thrush was plentiful throughout the forested areas of the Chyulu hills, but was decidedly more abundant in the Great Chyulu forest of the southern end. The birds were frequently put up from the forest floor or were noted feeding in various fruit-bearing trees. This race differs not at all from the Elgon form of the Kenya highlands in general habits but its alarm and call note is of a higher pitch and rather more rapid in expression reminiscent of the English Blackbird though not so full-throated: "cheeup cheeup chip chip chip," the last three rapid.

They were usually seen singly or in pairs and if in association with Starlings and Barbets on fruiting fig trees they acted the part of bullies and kept other birds from the branch on which they were feeding. They were particularly antagonistic toward Bulbuls. Stomach examination showed the presence of various small fruits, small mollusca, larvae of various orders, and mature Coleoptera.

One not infrequently found them in attendance on a trail of *Dorylus* (Siafu or Safari ants) in association with other birds, engaged in raiding the column for insects and larvae which the ants were carrying along. The method of attack was to hop toward the moving line, seize the desired prey, and with rapid lateral stroke on the nearest twig or leaf dislodge the attendant ant. Very often the ant would not release its hold, in which case it was swallowed along with the bit of desired food. The birds were always quick to get out of the way of the disturbed

and broken column, and even so, some few were nipped in the legs by the infuriated ants.

TAXONOMIC NOTE.

Nineteen adults and eight immature birds were collected. The first few specimens obtained indicated that we here had a race which differed from the Kenya highland *elgonensis* by its generally darker colouration, and efforts were made to secure an adequate series to ascertain if this feature was constant.

A comparison with a very long series of *elgonensis* shows that the chief differences lie in the much darker colouration of the upper side from forehead to tail. The whole aspect, including the wings, is darker olive-ashy-black; the loreal spot is black, and the earcoverts slightly less so. They thus differ from the race *elgonensis* which has the upper side olive-ashy with a decided brownish tinge (twenty-two specimens). On the underside the Chyulu birds have the throat and breast darker, more olivaceous, the tawny orange of the flanks and abdomen is on the whole darker, with less white toward the vent; the throat is more distinctly streaked with black. Geographically, this race is nearest to *T. o. deckeni*, Cab., of Kilimanjaro, from which it can be distinguished at once, *deckeni* having a much darker underside, though less dark uppersurface. From *T. o. oldeani*, Scl. and Moreau, by its strong olive dark upper side, as against a dark ashy-black without any trace of greenish tinge, and the presence of chestnut or orange tawny on the underside.

Type: Male, Chyulu Camp 3, altitude 5,600, 22/6/38. Coryndon Museum Expedition. Altitudinal range 5,000-7,200 feet, Chyulu Range. Comparative material of this race, 19 adult males and females, eight immature.

Wing measurements: Males, 110-119 mm.; females, 107-113 mm.

Within Kenya and adjacent T.T. I recognise the following races:

T. o. polius, Mearns.—Type loc. Lololokwi. Known distribution, from its type locality northwards to Marsabit, Mt. Kulal, and Mt. Nyiro at high elevations, and not apparently in the intervening plains. There is a tendency in this race toward the race *abyssinicus* as it goes north. Intermediates between *polius* and *elgonensis* are to be found on the Jombeni Range.

T. o. elgonensis, Sharpe.—Elgon, to the Cherangani, and Mau, crossing the Rift to Mt. Kenya, and the Aberdares and Kikuyu, and apparently to Longido and Kitumbeine (these last on authority of Moreau, B.M. identifications).

- T. o. chyuluensis*, van Someren.—Limited to the Chyulu Range.
T. o. deckeni, Cab.—Mt. Kilimanjaro and Mts. West, 4,000-10,000 feet.
T. o. roehli, Reichw.—Usambara and Pare.
T. o. oldeani, Scl. and Moreau.—Mbulu district, T.T.

It will be seen therefore that the race *elgonensis* has by far the widest distribution, but this is in keeping with the continuity of high forest in the Kenya highlands. I am not satisfied that the *Turdus olivaceus elgonensis* recorded from Nguruman are really typical of that race.

I have not included the bird described as *Turdus helleri* from Mbololo in the above grouping. The topotypical series I have is suggestive that it is a species. It has a longer, more slender bill than *olivaceus* and its general facies is different to the group as a whole. Doubtless it bears some similarity to *roehli* in the matter of distribution of white below, but I think it should be kept as a species. Jackson (Sclater) does not mention it in his recent publication, yet it comes from Kenya, and was described many years ago—1913.

GEOKICHLA GURNEYI CHYULU, Subsp. Nov.

Chyulu Orange-breasted Forest Thrush.

A series of 22 skins. Altitude variation 5,600-7,200. This bird inhabits the damp undergrowth of the great Chyulu Forest and its adjacent forested craters. It was not recorded from the north or central forested patches which have a very much drier forest floor and undergrowth. It was a noticeable fact that the species was most abundant in areas of the forest where *Connophyringia* was plentiful. The association with this forest tree was at first obscure until close observation revealed the facts. One had noted that many of the specimens obtained had the fore-part of the head smeared with a sticky brown substance and in some cases the facial and throat feathers were matted together. The conclusion was that the birds had become soiled in the process of eating some fruit. Most birds are extremely cleanly in partaking of fruit and it appeared obvious that the fruit eaten must be of fairly large dimensions and probably with a tough skin. Such is the fruit of the *Connophyringia*, and on several occasions I waited concealed under some bushes keeping in view the floor of the forest where masses of these fruits lay below the trees. It was not long before one noted that *Goekichla* visited the spot and were active in picking out objects from amongst the pulp of the fruit, obviously not taking mouthfuls of the fruit substance. When the fruits were examined it was

found they contained quantities of Dipterous larvae and a subsequent examination of the stomach of birds shot revealed masses of these larvae. Larvae of four species of flies were identified, and flies were subsequently bred out of the fruits for identification purposes. In addition to the larvae of flies, most of the stomachs examined contained small mollusca, worms, odd berries and larvae of other insects. The diet is, from observations made, 80% non fruit.

The habits of the bird are typically thrush-like; they are almost entirely terrestrial, only moving up into the bush and sub-strata of the forest when disturbed. Most of the birds had finished breeding (June-July) and the young in first speckled plumage were either in company with their parents or fending for themselves.

One nest was located in a thick tangle of creepers and *Piper*. The nest had a foundation of leaves and mosses, whilst the inner lining was composed of fine fern rootlets. Two greenish-blue eggs with very sparse spotting of dark brown formed the clutch.

The birds were usually met with in pairs as one worked through the forest undergrowth and to note them one had to take a few steps then peer along under the vegetation of the forest floor; walking casually through the forest one could very easily overlook the birds, as they are, for the most part, silent even when disturbed. A note in my diary records the brief call of the bird toward late evening before sunset as "ti-tue-tue-too-wee-to," and a chuckle if suddenly flushed from the ground. On one small rise in the great forest we obtained six birds which were turning over the forest debris in search of small snails which abounded in the spot. The turning of the dead and rotting vegetation was done by a quick lateral flick of the bill. The white ends to the wing coverts are a conspicuous feature as the bird hops along the ground with wings depressed and tail slightly raised, or when in flight.

TAXONOMIC NOTE.

This species was plentiful at the southern end of the main Chyulu Range. Twenty-two specimens were collected. It was desirable that a series should be obtained in order to note any possible variation, first because two undoubted species have until recently been confused, and secondly to test out the validity of described races, more particularly *G. gurneyi raineyi*, Mearns, described from Mt. Mbololo, and placed as a synonym of *G. piaggiae kilimensis* by Sclater in the "Systema." No comparative description was given with Mearn's diagnosis of *raineyi*, but he stated it was nearer to *G. g. otomitra* of Kondeland, than to *kilimensis* of Kilimanjaro. In the original description, the

under tail-coverts are given as "white throughout" and on this feature, Loveridge (*B. Mus. Comp. Zool.*, April, 1937, p. 243) states that *raineyi* should not be considered a synonym of *kilimensis* as suggested by Sclater (op. cit.) for *kilimensis* has "the under tail-coverts washed with cinnamon brown, and is smaller." The two, however, belong to different species.

In seeking to place the Chyulu birds I have obtained material from Usambara kindly loaned by Mr. Moreau, and the Coryndon Museum has a long series of toptotypical *raineyi* from Mt. Mbololo. It is as well to clear the identity of *raineyi* in its relationship to *usambarae*. Loveridge (op. cit.) has suggested that *usambarae*, Neuman, is possibly a synonym of *raineyi*, Mearns. Usambara birds have wings of 107-112 mm.; the under tail-coverts are buffy. In *raineyi* the wings are 110-115 mm. and the under tail-coverts are white. In all cases these feathers are not uniform, for all have their basal $\frac{2}{3}$ bordered with olive. Furthermore, the bills of *usambarae* are deeper, more robust, and less gradually tapering toward the tip. The average depth is 7 mm. in a length of bill from the front of the nostril to tip of 14 mm. There is thus a difference between *raineyi* and *usambarae*. When we compare the Chyulu birds with *raineyi* to the south we find that all have the under tail-coverts buffy, with the exception of two in slightly worn plumage; the ear-coverts are darker grey; and the brown mark before the eye toward the nostril is restricted, and is sharply demarcated by the blackish line of the lores. In *raineyi* the brown colour is shaded off toward the gape and there is no sharply defined black loreal line; the under tail-coverts are white. The dorsal olive of the Chyulu birds is greener less brownish tinged.

Comparing the Chyulu birds with *usambarae*, we note again that although both have the under tail-coverts buffy, the bills of the latter are more robust, deeper, more curved on the culmen, and more angled in the lower mandible, thus coming to a point more rapidly, not so slender and tapering. The dorsum of the Chyulu bird is greener. The wing measurements of the Chyulu birds are as follows: Males average 109 mm., the smallest female is 104, the largest male 112; tails 75 mm.

Moreau, *P.Z.S.*, 1936, p. 879, mentions that his birds *G. p.* of Kilimanjaro were compared by me with *keniensis*, Mearns, at his request, and that Sclater notes that "the Kilimanjaro bird is very close to *keniensis*. I note that Sclater in Jackson's Birds unites the two races. I am not satisfied that this is correct and maintain the two as distinct races.

In order to stress the fact that there are two species of *Geokichla* (excluding *G. guttata fischeri*) as pointed out by me in 1932, and to emphasise the point previously made by Mearns,

I give a list of the species and races from within the area dealt with in this paper. I recognise the following:

Geokichla gurneyi chuka, van Someren. Mt. Kenya.

Geokichla gurneyi raineyi, Mearns. Mt. Mbololo and Teita range.

Geokichla gurneyi chyulu, van Someren. Chyulu range.

Geokichla gurneyi usambarae, Neum. Usambara and Ulu-guru Mts. (Mts. Meru and Oldeani, authority, Grant and Praed).

Geokichla piaggiae piaggiae, Bouv., Ruwenzori-Elgon.

Geokichla piaggiae keniensis, Mearns, Mt. Kenya and Aberdares.

Geokichla piaggiae ? Subsp. Mt. Uraguess.

Geokichla piaggiae kilimensis, Neum. Mt. Kilimanjaro.

Geokichla piaggiae rowei, Grant and Praed. Loliondo and Arusha.

COSSYPHA SEMIRUFA INTERCEDENS, Cab.

Black-tailed Cossypha.

This species was plentiful throughout the forests of the Chyulu range and was met with from the low-lying forest patches of the foot hills at 4,000 feet to the highest point at 7,200 feet. It was the only species of this group, for there were no examples of *heuglini* throughout the range. It occurred in practically all the forest patches, from those of limited size of about an acre, where the substrata of the forest was much tangled, to the Great forest; but in the latter, and in the larger forests, it was noted to frequent to the greatest degree the thick tangled marginal growth rather than the interior of the forest, except in those craters where tree growth was absent in the floor of the crater, this being replaced by thick herbage, providing suitable environment. Thus if one desired to observe these birds, one worked the margin of the forest from within. In a day's collecting one could reckon on seeing more examples of this bird than most species, and its presence was invariably made known by its call. It is one of those species which on being disturbed will at once commence calling. My experience of this bird is now fairly extensive, and without hesitation I should place it as a forest bird in contradistinction to *heuglini* which is more often met with in bush country and cultivations than on the outskirts of forest land, if the forests are of the open type, and along bush-grown dongas.

The call note of this bird is quite different from *heuglini*, but like that bird, *semirufa* is an adept at mimicry, copying not only musical notes but calls of certain animals, such as Squirrels.

I more than once tried to locate the Chyulu Green Squirrel and found only this bird.

Soon after dawn, whether fine or raining, these birds will start calling, and indeed will, on moonlight nights, sing far into the night. It is difficult to separate the true song of the bird from the mixture of notes copied from the songs of other birds, but the call consists of three whistled notes like "hoo hoo hi-u," with a drop to the last, thus different to *heuglini* whose last note is higher and shorter, and ends in "whit." A low warbling song is also uttered from the depths of a thick cover: "tweu-tweu-chew-twee-to-twee-ger-ge." Mention has been made elsewhere of the raids made by certain birds on the columns of the "safari" ant, *Dorylus*. The *Cossypha* is equally proficient as is the *Tarsiger* in this daylight robbery. It is at such times that one sees the birds out of their retirement of thick undergrowth, but if disturbed they at once seek cover, but remain in the vicinity and call. Though retiring in habits, they are not wild, in fact if one penetrates into thick undergrowth where they are, one can approach quite close to them and it is with difficulty that one can get them to move sufficiently far away so as to avoid damaging the bird if one desires to shoot it.

At the time of our visit to the Chyulu range, April-July, the nesting season was just over and nestlings were on the wing though still attended, in many cases, by their parents.

TAXONOMIC NOTES.

I am satisfied from the extensive material available that *heuglini* and *semirufa* are two distinct species, each with their geographical races. This is contrary to the possibility cited by Friedmann and Loveridge (*Bull. Comp. Zool.*, Vol. 81, No. 1, p. 250, 1937) as follows: "The forms of . . . *semirufa* are very closely allied to *heuglini*, and it may well be they are all one species."

There is a considerable overlap in the distribution of the races of both species, thus on Kilimanjaro both are found, as they are in the forests round Nairobi, but each has its own environment and thus ecologically separated, but not to such a degree as to suggest that they are one species. Friedmann, op. cit., draws attention to *semirufa* of Kilimanjaro and suggests that these birds may not be the race *intercedens*, but Cf. Moreau, *P.Z.S.*, part 4, 1936. I have five Kilimanjaro birds before me, the long series from Chyulu, specimens from Mt. Kenya to Nairobi and Kitui (type loc.) and I cannot see any characters on which to separate the Kilimanjaro birds. The colouration of the mantle is not constant; in nine out of 14 males from Chyulu this area is dark slaty-grey, in the rest this area is washed with

olive to a greater or less degree. Of the females only two are grey, the remainder, eight, are strongly olive washed. There is just such variation in the Kilimanjaro and other birds. In twenty of the Chyulu birds there is a strong tendency for the orange tawny of the sides of the neck to extend back and encircle the neck below the black of the occiput; this is found in Kilimanjaro birds, so also in Fort Hall birds.

Wing measurements give the following:

Chyulu: Males, 90-95 mm.; av. 91 mm. Females, 82-98 mm.; 85 mm.

Kilimanjaro: Males, 92-95 mm. Females, 65 mm.

Kiambu, Fort Hall, Nairobi: Males, 90-93 mm. Females, 82-93 mm.

Kitui: Males, 90 mm. Females, 82 mm.

COSSYPHA CAFFRA IOLAEMA, Reichw. Red-breasted Cossypha.

The Red-breasted *Cossypha* or Robin was found to be rather scarce as during our stay only a dozen birds were seen. Two were obtained for record purposes. All the birds noted were found on the northern end of the range, 5,500 feet, and none seemed to exist in the Great Forest. Insects only were recovered from the stomachs. The consensus of opinion seems to be that *C. i. mawensis*, Neum., is not a valid race. I have no decided opinion on this point and await more Kilimanjaro material.

Friedmann and Loveridge state (*Bull. Comp. Zool.*, 81, No. 1, 1937, p. 252, that "in the east it does not occur north of Kilimanjaro." This is incorrect, as Chyulu birds are from N.E. of that mountain. Friedmann knows of no record from Mt. Kenya, but birds from that mountain are in my collection.

SAXICOLA TORQUATA AXILLARIS, Shelley. Kilimanjaro Stone Chat.

The Kenya Stone Chat was plentiful throughout the range, frequenting the open moorland and grass slopes from 6,800 feet to 4,000 feet. It was particularly in evidence on areas which had recently been burnt off leaving the sprouting grass exposed and the scorched stems of the woody herbs standing bare. From the latter vantage points these little birds darted down to snap up any insect which made itself visible. In such locations they fed largely on larval or nymphal forms of the smaller grasshoppers as examination of stomachs of shot specimens showed. They were also very active when the flying forms of white ants appeared. No highland scene is complete without these birds, and the Chyulu Hills had their fair quota of the species. Where

the grass was long and rank, one found the Chats at the edges of the forest patches perched on the top of the dead stems of *Leonotis*, a plant which grew in profusion along the forest margins. The Chyulu birds were confiding and tame and took hardly any notice of one in passing them. The nesting season was well over in April (third week) and all the young were fending for themselves.

The race *axillaris* was described from Mt. Kilimanjaro and the specimens on Chyulu agree with that form. Granvik (*Jrl. fur. Ornith.*, Feb., 1923) wrote at length on the variability of this Stone Chat within Eastern Africa and suggested that *axillaris* was not sufficiently separable from *salax* of Gaboon. Recent authors have maintained the validity of the Kilimanjaro bird, and with this I agree.

The material I have from the Mau, particularly the females, run very much larger than Uganda or Chyulu birds and are much browner above and more uniform brown below. The series is very uniform, as are the Chyulu birds, and suggestive of a good local race. More material from the Mau is required.

POGONOCICHLA STELLATA MACARTHURI. Subsp. Nov.

Chyulu White-starred Tarsiger.

This bird was one of the commonest species of the forest undergrowth and was found in practically all the smaller forest patches as well as the bigger blocks and was exceedingly plentiful in the Great Chyulu forest of the southern end of the range. The altitudinal range varied from 4,500 feet to over 7,000 feet.

Not only was it conspicuous on account of its brilliant plumage, but its very confiding and withal inquisitive habits, brought it to one's notice at all times. Furthermore, its presence was made known by its low song and chatter. When one was engaged in cutting traverses through the forests several of these birds would appear along the track already cut, or would flit about the under-bush as the workers progressed. Very often they would perch within a couple of feet of one, and as the insects were disturbed by the cutting of the bush, they would dart hither and thither. The insects were taken both on the wing and on the ground.

Although for the most part terrestrial they are adepts at catching flying insects. Unaided, quite a proportion of their insect food is taken by rummaging amongst the decaying vegetation and leaves of the forest floor. Most stomachs examined contained insects, either mature or in the larval stages, as well as spiders and small mollusca, and occasionally a few small berries.

Two notes or songs were noted. The song is an oft-repeated "tu-we tu-we ti-ti," whilst the note uttered when disturbed is

like the noise made in a wooden ratchet turning the arm slowly over the teeth or cogs, "pirut pirut" repeated frequently.

This was one of the late nesting species on the range, for whereas practically all the young birds of other species had left their nests and were fending for themselves, young of this species were found as nestlings or accompanied and still fed by their parents. The nests found were in a cleft or hollow of a moss-grown tree trunk or tree stump; composed of mosses and lined with fern and orchid roots. No eggs were found, but nestlings a week old were located on two occasions. The nests certainly blended with the rest of the moss-covered tree, but the actual situation of the tree was often quite exposed with little or no herbage nearby. One nest was located at the base of a clump of fern growing on the base of a partially fallen tree.

I more than once heard these birds warbling late in the night, especially when there was a moon, and they were certainly one of the first species to give voice in the early mornings at sunrise. One pair frequented the outskirts of our camp kitchen and took odd fragments of food thrown to them, such as bits of meat and rice. At Camp 3 a pair exhibited their fearlessness of man by perching close beside me while I broke up a rotten log infested with white ants. As bits of the wood were broken off and tossed aside, the birds would hop down and pick off the ants one after the other with extreme rapidity. This species is one of those who raid the columns of the "safari" ants. It was a common occurrence to note three or four of these birds in the vicinity of the trail. With daring and considerable accuracy they would dart or hop to the side of the trail, seize the insect or larva being carried along by the ants, jerk the morsel against the ground to rid it of its attendant ant and swallow it, or if young were in the underbush nearby, fly and push it down the youngster's throat with scant ceremony, and return to the fray. Needless to say, a column of ants much worried by attendant birds (and several species take part in these robberies) very soon becomes infuriated and the soldiers will move out of the column to protect the workers; but the birds are usually too quick in their actions to suffer from attack. The strong bristles at the corner of the bird's mouth protect them when picking up prey.

In spite of the brilliant yellow of the underparts as seen when the bird is near the ground, when they are disturbed from the forest floor and ascend to the mid-growth or perch among the tangle of lianas, they are difficult to detect; the yellow breast harmonises with the vegetation and the dark head breaks the contour. It may be noted in passing that the characteristic silvery-white spot on the lower throat is not visible when the

bird is at rest, but is a conspicuous feature when the bird is warbling, for the throat is then extended. In general carriage and demeanour, the Tarsiger reminds one forcibly of the English Robin; the wings are generally carried depressed below the slightly upraised tail, which is frequently "flirted" or expanded, and the body held rather upright. It is an altogether charming species.

TAXONOMIC NOTE.

Confusion has revolved round this species, due partly to the fact that the species has three distinct phases of plumage; adult, sub-adult, and nestling, each being distinctive. Moreover the species is subject to geographical variation into races but in most cases the differences are not striking.

The birds from the Chyulu Range are geographically intermediate between the Kenya race *keniensis*, Mearns, a race which is not recognised by Sclater, and *guttifer*, Reichw. and Neum., of Kilimanjaro.

First of all, a critical examination of the very large series of this species, 200 specimens, leads me to support *keniensis*. To the south-east of Chyulu is the Mbololo Hill from whence came the type *helleri* Mearns. I am assured by Moreau (in lit.) on the authority of Kinnear of the B.M. that the Teita birds do not differ from *orientalis*, Fischer and Reichw., of the Usambara Range.

The Coryndon Museum now has a series from Mt. Mbololo, topotypical *helleri* (12 skins).

DESCRIPTION: A careful examination of the Chyulu birds shows them to be paler, clearer yellow below than *orientalis* (including *helleri*); paler yellow on the rump and upper and under tail-coverts. The yellow on the tail is purer; the green of the mantle is a purer green; the colour of the head is darker. They are thus different to the race *guttifer* of Kilimanjaro, which has a darker yellow under side and the green of the back is washed with golden, and quite distinct from *keniensis*.

Type: Male, Chyulu Range, 7,000 feet, 1/5/38, in forest undergrowth, Coryndon Museum Expedition, 1938.

Remarks: Forty adult paratypes were taken and also a long series of sub-adults and birds in nestling plumage.

Wing measurements: Males 82-86, average 84 mm.; females 75-82, average 77 mm.

Taking the Tarsigers of Eastern Africa as a whole we find that we can divide them into two main groups, those with golden-olive backs and those with olive-green mantles. Into the former fall:

ruwenzori, Grant. Mt. Ruwenzori, Kivu, Kigezi. A small bird with dark breast, a very small white throat-patch, and hardly any, a mere trace of the white supra-orbital mark.

elgonensis, Grant. Mt. Elgon. Birds with, in the adult, uniform black tails.

keniensis, Mearns. The golden olive of the back is lighter than in *guttifer*, Kenya, Aberdares, Mau, Kikuyu. The plumage of the nestlings also differs, so also the sub-adult.

guttifer, Reichw. and Neum., Mt. Kilimanjaro. Darker on the mantle and head than *keniensis*. Young differ from *keniensis*.

In the second category come:

orientalis (helleri), Fischer and Reichw., Usambara, interior of T.T. (Morogoro). The olive-green of the back without strong golden wash; and underside darker yellow than *macarthurii*.

macarthurii, van Someren, Chyulu Range. Paler yellow below, greener on the mantle; head darker, the young in nestling plumage, and still more in sub-adult, which is strongly olive below with narrow yellow streaking.

It is not out of place here to draw attention to the three distinct phases of plumage which is exhibited in each of the races of this species. This is the more desirable since it is possible to differentiate the races on the plumage of the nestling and sub-adult, when the adults show only very slight, though constant differences.

The first or nestling plumage is a spotted one in all the races within eastern Africa, such spotting extending from the crown to the upper tail-coverts on the upper side, and from the chin to the vent and under tail-coverts below. The greater and lesser wing coverts are also spotted at their tips. In this stage there is a decided difference in the general tone both of the ground colour and the spots in the various races I have mentioned.

The spotted plumage gives way by moult to a stage in which the whole of the upper surface becomes a uniform olive-green, with or without any golden tinge, according to race; the upper tail-coverts are only slightly less green than the mantle; the underside becomes more mottled than spotted, and this change is due to a moult. The future white throat spot is indicated by an area of whitish or yellow, occupying a larger area than the ultimate characteristic silvery white triangular spot, and if a specimen is viewed from the side, this pale area shows

as a pale gorget or fore-neck band. I mention this because of the controversy over the true interpretation of Levaillant's figure of *stellata*.

The sequence of moult from nestling to sub-adult is clearly shown in the very long series of fifty-odd in these stages.

From the spotted to sub-adult, the first area to change is that of the upper mantle and nape; this is followed by a replacement of the head and rump feathers and of the upper breast; the change gradually extends to the whole head and underparts and then the wings. For quite a long period the spotted feathers are retained on the scapular and lower mantle. It is as well to mention here that in the case of *elgonensis*, which in the adult has a uniform black tail, in the young and sub-adult the bases of the rectrices are yellow to a varying degree.

The subsequent moult from sub-adult to adult is more difficult to follow owing to a remarkable lack of these intermediates, for out of the long series of well over 100 specimens, only two show traces of the sub-adult plumage as evidenced by the retention of olive-green feathering on the crown, the mottling on the throat and remains of mottled feathers on the chest. The sub-adult wing-coverts and also tail feathers are still retained. It would appear that the wing and rectrices are not changed until after the body plumage has been renewed by moult, the replacement of the tail following that of the wings.

I have dealt with the sequence of plumages at length because Friedmann and Loveridge have suggested (*Bull. M. Comp. Zool.*, Vol. 81, p. 257) that the plumage of *orientalis* "is more uniform green above, not as spotted as in *guttifer*, which form can hardly be told from the present (*orientalis*) in adult birds." I can only suggest that Loveridge only collected sub-adult or immature and not nestling plumaged birds and has mistaken them for the latter.

It is true, however, as I have indicated previously, that the visible differences between the, at present, recognised races of *Pogonocichla* are corroborated by equal or greater differences in the plumages of the nestlings and sub-adult, if young of similar and comparable age are examined.

SYLVIIDAE.

PHYLLOSCOPUS TROCHILUS TROCHILUS	European
and	Willow Warbler.
PHYLLOSCOPUS COLLYBITA ABIETINA.	Scandinavian
	Chiffchaff.

During the first two weeks of our stay on the range, April 19th to 30th these two species were frequently noted in the

smaller forest patches. It was of course impossible to estimate the relative numbers of each. One noted them as associating with *Zosterops* and *Seicercus*, and the similarity of behaviour between the last and *Phylloscopus* was marked. The only species of migrant which remained in evidence after the end of April was the European Swallow.

SYLVIA COMMUNIS COMMUNIS European Whitethroat.

and

SYLVIA BORIN. European Garden Warbler.

In the early morning of April 20th about twenty of these birds were noted in a small *Erythrina* association, together with a few Garden Warblers. They remained throughout that day but had moved on by the following morning.

SYLVIA ATRICAPILLA. European Blackcap.

This species was recorded on April 23rd when two birds were seen near the only water drip of the entire range at about 5 p.m.

EREMOMELA GRISEOFLAVA nr. ABDOMINALIS.

Chyulu Yellow-bellied Scrub Warbler.

In the *Erythrina* association and the scattered bush country of the upper lava flows, this species was met with in pairs or small groups of half a dozen. They were always engaged in hunting insects amongst the *Erythrina* flowers or those of the wild *Clematis* and *Acacia* blooms. They were always on the move and kept up a low "see see" call. In action they remind one of the Penduline Tits but are perhaps not so restless, more deliberate in their movements.

TAXONOMIC NOTES.

Amongst a long series of the race *abdominalis* I find none so pure grey from crown to rump as these Chyulu birds nor with throats so pure white, thus contrasting more with the greyish breast band; it is possible that they represent a distinct montane race.

The distribution map by Friedmann in *Bull.* 153, U.S. Nat. Mus. is incorrect in such respects as those I gave on page 370, *Nov. Zool.*, 1932. Thus he shows the race *abdominalis* as occupying Ukambani-Masai area only, but the type locality is Tabora district over which he depicts the race *crawfurdi*, in other words the distribution of race 6 is too far extended south and race 5 should extend to the west and south of 6 to include Tabora district, Morogoro, and Dodoma. As regards Friedmann's race 4, embracing two, *flavicrissalis* and *erlangeri*, the distribution of the latter (which has far more yellow on the abdomen than the

former) would cut across that of the former or be included within it. I can only presume that Friedmann does not trust my identifications. Friedmann's remark that *crawfurdi* is a paler form is apt to be misleading, for it is a much darker bird above than *abdominalis* though the yellow of the abdomen is paler, further it is not the only race with a whitish superciliary stripe; two birds from Morogoro have this character and they are not *crawfurdi* but near *abdominalis* if not identical with it.

SYLVIETTA WHYTII LORINGI. Chyulu Stump-tail Warbler.

Very few of this species were seen on the hills, and these were limited to the *Erythrina* clumps and *Acacias* of the lower lava flows, 4,000-5,500 feet. They are silent little birds for the most part; intent on their search for insects they will often allow one to come within a few feet of them; or, if one is taking shelter under a tree, the birds will work the branches just over one's head with unconcern.

TAXONOMIC NOTE.

Looking up the latest literature containing reference to the group of *Sylvietta* of the *whytii* aggregate I find that Friedmann, op. cit., 1937, has to a certain extent agreed with my findings as recorded in 1932, except that he hesitates to recognise the validity of *fischeri* of the coastal belt of Kenya. He, however, supports *loringi*, Mearns, for the aggregate which represents the species between *fischeri* of the coast and *jacksoni* of the Kenya highlands. One notes, however, that Sclater and Moreau refer birds from Ngare-Nairobi, Kilimanjaro to *jacksoni* as also birds from Marang and Nou, Mbulu district.

The identifications of these Mbulu birds are correct so far as my limited material from about that area goes (Oldowai) and it is to be presumed that the Ngare-Nairobi birds are part of the intermediate aggregate between *jacksoni* and *fischeri*. I presume this because specimens from Moshi and the Chyulu Hills, Taveta, east to Voi, are of this intermediate class. Sclater, however, in the "Systema," makes *loringi* a synonym of *jacksoni*, which in my opinion is a mistake.

SEICERCUS UMBROVIRENS CHYULU. Subsp. Nov.

Chyulu Green-winged Brown Flycatcher-Warbler.

In all the forests of the Chyulu range this Willow-Warbler-like bird was plentiful; its charming behaviour and not unpleasant call were features of the forest life of the hills. It was most plentiful in the larger forests at altitudes varying from 5,000 feet to 7,200 feet, and though often noted in the canopy, especially those larger trees with masses of tangled lianas, it

was equally at home in the thick creepers which bound the trees at the edge of the forest. It makes a variety of calls: a simple "pee-piri," or a series of clear notes like "chui chui chee chee chee" or "tui-tui twee twee," either simple or with little trills. It takes the greater part of its food by hunting amongst the leaves, branches, and creepers on the trees, but it will on occasion flash out after some insect which has escaped it, and seize it in mid air in the manner of a fly-catcher. This is one of the birds which appears to have no fear of man, for times without number a pair which would be hunting the trailing creepers of trees near which I was sitting would come within a foot or so of my head and pass by as though I had not existed.

Old nests were found but no eggs; all the young were on the wing, and some of those noted and obtained could not have been long from the nest. But for the browner backs these young could easily, and in fact were mistaken for the migratory Willow Warbler during the short time these migrants were still on the range. The underside of the young *Seicercus* is strongly washed with yellow.

Fifty odd of these little birds were collected, many of them by accident, for in the depths of the forest it was almost impossible to differentiate between the small birds moving about at the tops of the trees.

TAXONOMIC NOTE.

In seeking to place the birds from the Chyulu Range, some fifty odd examples, I have laid out the entire series of the species in its distribution from Elgon, through Kenya, to Kilimanjaro and the Pare range. Each of the races is represented by long series, and Mr. Moreau has supplied me with material from the Pare.

First of all I should like to record my views on the two described races *mackenziana* and *dorcadichrous*, the former represented by birds from Elgon, Mau, Kikuyu, the latter by Kilimanjaro birds. My ample series shows that these are separable, and I maintain the races.

DESCRIPTION: The Chyulu birds are described as follows: Very much darker on the head and dorsum than *mackenziana*, lacking the rufous tinge of that race; much less rufescent on the sides of the head and sides of the body. From *dorcadichrous* they differ in being much darker particularly on the head, more buffy-grey on the sides of the head and flanks; and purer white on the abdomen; the undertail coverts are strongly lemon yellow while the edging to the coverts, secondaries, and primaries, and tail feathers are purer green less yellow-green. The dorsum feathers are narrowly edged with greenish.

Type: Male, Chyulu Range, 6,000-7,200 feet, 21/6/38. Coryndon Museum Expedition, 1938. Paratypes fifty-four.

Remarks: For the time being I associate with these birds a dark race from the Pare, sent to me by Mr. Moreau. They are still darker on the head, and some may desire to recognise them as a further race. I think it would be a mistake to select one of the Pare birds as the type of the Chyulu race, the more so that in dealing with this Chyulu material as a whole, I find it to represent in many cases races which are apparently limited to that range.

SEICERCUS RUFICAPILLA MBOLOLO. Subsp. Nov.

Closely allied to *minulla*, Reichw., of Usambara, but differing from that race by its lighter olive-brown crown; slightly paler mantle; more yellow ear-coverts; wider extension of the yellow on the throat, this colour extending on to the breast and abdomen but in a paler shade of yellow. The grey of the underside, on the side of the breast and flanks, being just a wash, thus one would not describe the underside as grey. Type: Male, Mt. Mbololo, Oct., 1938, 5,000 feet.

Distribution: Mt. Mbololo, Eastern Teita Range. Paratypes, six adults. Compared with typical *minulla* kindly supplied by R. E. Moreau.

MELOCICHLA MENTALIS CHYULU.

Chyulu Great

Moustached Warbler.

Here and there along the forest edges where the tall grass merged into the fringing woody herbage, and in the ravines of the moorland where the grass was often shoulder high, this species was noted. It was difficult to procure except in the early mornings or late afternoon; at these times one might see the birds sitting on the grass stems enjoying the sunrise or the dwindling rays of the setting sun. During the day they were hidden, or if seen it was just for a moment and they disappeared into the grass.

The only note I have as to the call of this bird is that it is like a throaty gurgle ending with a higher note and interpreted as "kluk kluk kluk cheir."

TAXONOMIC NOTE.

Comparing the specimens from Chyulu with a long series of *orientalis* and the Uganda race *amaurora*, I find them to differ. Before detailing these differences I should make it clear that I associate the Kenya coastal birds with *orientalis* described from the Pangani River. They are more rufous above and more rufous below than *amaurora*. The intermediates occur over a considerable area of junction of the two forms.

In seeking to find a name applicable to the Chyulu birds, I find *kilimensis*, Madaraz, founded on birds from Moshi. I have a series from this locality, and they agree with the coastal race *orientalis*.

The Chyulu birds are nearest geographically to *orientalis* but differ from that race in being considerably darker above, more olivaceous, but less rufous on the breast and flanks, even paler than the race *amaurora*. The ear-covers are a darker brown than in *orientalis*, and the rectrices are black, but greyish tipped on the underside. Rump and upper tail-coverts only slightly more rufous than the mantle.

The Chyulu birds represent a dark montane form with an altitude range of 5,500-7,000 feet.

Type: Male, Chyulu Range, 26/6/38. Coryndon Museum Expedition, 1938. Paratypes, five males, three females. Size smaller, 70-73 mm.

BRADYPTERUS CINNAMOMEUS CHYULUENSIS.

Subsp. Nov.

Chyulu Cinnamon Warbler.

The Cinnamon forest warbler was often seen on the high ridge of the Chyulu hills at elevations of 6,000-7,200, but not in such numbers as the Brown Warbler. It was unfortunate that a long series was not collected, due entirely to the fact that of the various races already described many writers have asserted that there is no distinctive size or colour variation limited to any particular area and have treated all as one race.

TAXONOMIC NOTE.

I have laid out all my material of this species, some fifty odd specimens, and I cannot find any which agree with the Chyulu birds. Knowing the various views published, to the effect that many of the described races are untenable, I have gone very carefully into the matter. So far as the Kenya representatives of the species are concerned there is some variation and according to Sclater they cannot be disassociated from the Abyssinian nominate race.

I am satisfied that one can admit as distinct (a) the birds found in the Kivu-Kigezi area, (b) the birds of Kilimanjaro, (c) the birds of the Chyulu range.

Description: Allied to *rufostavidus* of Kilimanjaro, the Chyulu birds are very much darker on the back from crown to rump, almost as dark as *B. mariae*; certainly as dark as *B. brachypterus* of Kenya; crown slightly darker than the mantle; wings and rectrices darker than in any other race; the cinnamon colour of the breast band and flanks is, however, duller; throat and centre of abdomen white. Type: Male, Chyulu Range,

7,000 feet, 5/5/38. Coryndon Museum Expedition, 1938. Paratypes 4.

Remarks: In view of the controversy over the distinctness of several named racial forms, it might appear unwise to describe yet another race, but I cannot match these dark Chyulu birds with any of the long series of more than fifty birds from Elgon southwards.

BRADYPTERUS MARIAE, Mad. Chyulu Forest Warbler.

In the great Chyulu forest of the southern end of the range, and in its extension along the western aspect of the hills, this bird was very plentiful in the sodden and constantly wet undergrowth. Indeed it might with truth be said that it was the common bird of the undergrowth. On all occasions it was noted and its distinctive note was heard on all sides. Its elevation range was 5,500 to 7,200 feet and although plentiful in the southern part of the range it was entirely absent in the forests of the north and central portions which are drier with less dense undergrowth. On many occasions I noted that these birds had a trait common to *Bradypterus brachyterus centralis*, that of calling in duet. This has been noted also by Moreau in the case of *B. usambarae*.

My notes record the calls as "tiku tiku tiku tik" or "Cheetu cheetu" and "cheu-cheet cheet." Moreau likens the call to "chichew" or "pi-pew" for *usambarae*, thus somewhat alike.

The general behaviour of this bird is similar to that of the Kenya highland race named by me *altumi* (Cf. note hereafter). They creep—one can use no other word to express their movements—about the undergrowth and pick off insects from the stems and leaves of the plants and where soaking wet lianas and beard moss descend some way down a tree trunk one may note them searching through the tangle. Stomach contents showed that not only did they eat insects but also small spiral mollusca which were plentiful on the undersides of leaves of the *Piper* which formed the bulk of the forest undergrowth. These birds were concentrated in many places where the forest trees did not extend so as to cover the floor of the crater. In such localities the undergrowth was almost pure *Piper* growing to 8 and 10 feet high, and here several birds might be noted.

TAXONOMIC NOTE.

There has been considerable confusion over these forest *Bradypterus*, and for this reason a long series of over 60 examples was taken on the Chyulu Range. The series represents three phases in the plumage of the bird: adult, sub-adult, and juvenile. In the first or nestling plumage, the underside is strongly

suffused with olive from the throat and cheeks to the mid-breast and abdomen, with the flanks olive-brown. The dorsum is very similar to the adults but duller, and of course, the texture of the feathers is different.

In the sub-adult, most of the olive is lost on the underside except for a slight trace along the mid-line; the throat is whitish, with olive flecks; the remainder of the underside is more uniform ashy-brown than in adults; on the mantle, there is a distinct greyish tinge. The rich dark brown of the adult is assumed by a body moult and at the same time the wing and tail feathers are replaced, the latter being shed first. The tail feathers, ten in number, are narrow and "decomposed," and graduated.

In attempting to assign these Chyulu birds to a given species, I have consulted all available literature and examined all allied birds as we find them within Kenya and the adjacent parts of Tanganyika Territory.

First of all there seems no doubt that the bird I described as *mitoni* from the Moshi River forest is identical with *mariae* of Madaraz described from Kiboscho, Kilimanjaro, as stated by Moreau. *Mitoni* is retained as a species in "Jackson's Birds," but this was due to lack of comparative material.

Sclater, in the "Systema," makes *mariae* a race of *barratti*, Sharpe. A closely allied bird is *altumi* described by me from Molo, with a distribution from Mau to Mt. Kenya. I associate with this race, specimens recently obtained by Meinertzhagen and referred by him to *mariae* (*Ibis*, 1937), thus indicating a close relationship between Kilimanjaro and Mt. Kenya birds. Thus far, the association appears straightforward, but on consulting Friedmann in *Bull.* 153, U.S. Nat. Mus., p. 166, we find he associates my *altumi* as closely allied with *fraterculus*, Mearns, from Kikuyu Escarpment. Furthermore, he places *fraterculus* as a race of *alfredi* which came from west of Lake Albert. We find on pages 166-167 a statement to the effect that the type of *fraterculus* is a bird with 10 rectrices (although he admits that the type has had all but one feather shot out), associating with it a female from Mt. Kenya with this number. Friedmann is at pains to show this characteristic of *fraterculus*, but on page 170 he associates it with a species which has 12 tail feathers! This seems to me very strange and contradictory. The bird identified by Og. Grant as *alfredi*, *Trans. Zool. Soc.*, Vol. XIX, and there figured, has 12 rectrices. This bird was subsequently made a race and described as *albicrissalis* by Neumann. My *altumi* is a bird with 10 narrow tail feathers. On page 171, Friedmann places *fraterculus* and *usambarae* as races of the same species.

SCHOENICOLA BREVIROSTRIS CHYULU. Subsp. Nov.
Chyulu Fan-tailed Grass Warbler.

This very remarkable Warbler, remarkable for its excessive tail, was not uncommon in the tall grass moorlands of the range. One would imagine that a tail of this length and breadth would hamper the bird in its movements among the grass especially when the vegetation was wet and the tail, as one knows, becomes bedraggled.

As one walked through the grass these birds would be flushed one here, one there, to drop after a very short flight. If one noted the spot where they landed and walked them up, it was a one in ten chance that they would be flushed again. It would seem that on landing they creep through the grass rapidly and then lie quiet.

It is probable that the length and width of the tail is then of assistance, for it would bear them up somewhat as they moved through the grass stalks. This we know to be so in the case of the long-tailed lined Skink which abounded in the grass-lands.

These birds make two calls, a sharp "prit prit" varied with a "seesee" and a rattling note which rises and falls.

TAXONOMIC NOTE.

Several students of East African ornithology have discussed the validity of the several races described for this bird throughout its distribution, and on the whole have come to the conclusion that the Uganda birds represent a darker race of the nominate South African form. These Uganda-Kenya birds may be known by the name *alexinae*, Heulg., type loc. Gazelle River, which antedates *brunneiceps*, Reichenow, type locality Acholi. I thus support Bannerman in *B.B.O.C.*, lvii, p. 70.

If one compares these twelve Chyulu birds with a similar series from Uganda and Kenya Highlands, it is noticeable that the Chyulu birds are darker than the darkest Uganda bird, the brown of the mantle having an olive tinge whilst the crown is decidedly grey olive tinged. The tone of the crown is considerably darker than that of the mantle. The wings and tails are even blacker. The sides of the breast and flanks are washed with olive, not so pale ochreous; the ear-coverts are darker. Type Female, Chyulu Hills, 5,600, 10/6/38. Coryndon Museum Expedition, 1938. Cotypes 11 specimens. Alt. range 5,500-7,000 feet.

C. Grant (in lit.) supports the race *alexinae*, and suggests that the Chyulu birds are of this race, but I consider them to be distinctly darker. He suggests that the Chyulu birds are dark-

ened by burnt grass; but even when they are cleaned up the darkness remains, and I am satisfied that it is not due to staining.

I have submitted these Chyulu birds to Moreau, who writes as follows: "I laid out your skins (six Chyulu, six Kenya-Uganda birds) and after trying one or two other things—all of course 'blind' so far as the labels were concerned—I made a division with no hesitation, on head colour. I then found I had five Chyulu skins and no others in the 'grey headed group,' only one was an approach to the 'ginger headed' group."

CAMAROPTERA BREVICAUDATA GRISEIGULA \sum
ERLANGERI. Chyulu Green-winged Bush Warbler.

These birds were plentiful in the undergrowth of the lesser forests on the Chyulu hills but did not occur in the Great Chyulu Forest. They were more numerous at lower altitudes, round about the 4,000-5,500 level. Their characteristic "mewing" note was often heard.

It is difficult to determine these birds as referable to a given race inasmuch as they have the characters of the coastal race *erlangeri*, of which *albiventris*, Granvik, is a synonym, and some of the characters of that unfortunate intermediate aggregate named by Sharpe, *griseigula*, type loc. Voi River. I have written at length on these birds in *Nov. Zool.*, 1932, and this additional material only strengthens my views already expressed.

PRINIA MYSTACEA. Long-tailed Wren Warbler.

This species was plentiful all along the forest edges in pairs or small lots of parents and young. Their characteristic behaviour and call was a feature of the forest margins. Being an abundant species insufficient attention was paid to them. This is unfortunate for these Chyulu birds exhibit a darker, more olive tinged plumage on the head and mantle than any in a long series from the Kenya highlands; furthermore, the white superciliary stripe is very well marked. I hesitate to place them as the race *immutabilis* and they are distinct from the coast birds *tenella*. Five birds were collected, all uniform, except for one young in sub-adult plumage

APALIS FLAVOCINTA. Long-tailed Yellow-banded Warbler.

A few examples of this species were noted in the more open forest patches and along the forest edges. Tails 61 mm.; wings 50 mm. Range 5,000-7,000 feet.

APALIS Sp.

A single specimen of an interesting *Apalis*, probably near *moschi*, van Someren, was the only one seen. It is sexed as a male and is probably not mature. It remains one of the indeterminate species of the range.

APALIS GRISEICEPS CHYULU. Subsp. Nov.

Chyulu Bar-throated Forest Warbler.

These little birds were actually plentiful in the larger forests but owing to their habits were easily overlooked unless one was deliberately in search of them. Thus after the first few were obtained and the exact type of place to look for them was noted, we had no difficulty in obtaining a good series. As there has been some considerable discussion as to the species and races of these little birds, I paid particular attention to them. There are now forty odd examples from the Chyulu hills.

These birds are for the most part to be found in the canopy of the forest, but not in every sort of tree. I found them to be partial to those which were heavily encircled with lianas so much so that one could not actually see daylight through them. It was here that one noted the birds; merely a slight movement as the bird crossed some small opening in the foliage. One had then to wait for perhaps quarter to half an hour before they appeared on the margin of the creepers or having worked through them to the lower side of the canopy. Incessantly on the move, one has little time to aim; it was a case of directing the shot as quickly as possible toward the spot where movement had taken place. Occasionally, and particularly after an early shower of rain in the afternoon, one might find these birds hunting over the lichen and beard-moss-covered branches of tall trees toward the edge of the forest, or in the creepers around their trunks. It was then that one could observe them. Minute insects and spiders were all that one found in their stomachs.

TAXONOMIC NOTE.

Differs from *griseiceps* from Kilimanjaro, by their purer green, more leaf-green, less yellowish tinged, mantles; the crown and cheeks ashy-grey, not brownish-ashy; the margins of the wing-coverts and wing feathers purer green; the colour of the abdomen is a clear lemon-yellow, separated from the black collar by a pure-white area; loreal spot black.

Type: Male, Chyulu Hills, 26/6/38, 5,800 feet. Coryndon Museum Expedition, 1938. Paratypes forty-three specimens.

Remarks: This series has been compared with typical *griseiceps* from Kilimanjaro. There is some slight variation in the colour of the heads and out of this series only three show an

approach to the Kilimanjaro race, but they exhibit the other characters which differentiate them.

I am in agreement with the recent division advocated by Grant, *Ibis*, 1938, that there are two species of these *Apalis* exhibiting similar general characters, the one species having green mantles, the other grey, *murina*, Reichenow. It has been remarked by Friedmann and Loveridge, *Bull. Comp. Zool.*, 1937, that altitude does not appear to be the dividing factor between the species, for both are found at similar altitudes.

The altitude range of the Chyulu race is 5,000-7,200 feet on the Chyulu Range.

CISTICOLA NATALENSIS. Subsp.?

Large Striped
Grass Warbler.

Two species of *Cisticola* were plentiful throughout the grass moorlands of the Chyulu Hills; of the two, a race of *natalensis* was less in evidence. Only one other species was noted. Usually the first indication one had of the presence of the bird was its distinctive call which, on account of its periodicity came to be known as the Clock Bird. One first of all heard the repeated call "Click clock" and scanning the grass land with a pair of binoculars, looking particularly at any projecting herb, one would pick out a cock bird sitting on the topmost twig of a hidden bush. They were timid, and seldom allowed one to approach very near. If flushed they flew some distance and again took up their position on the top of a bush; they seldom went to the tops of the *Erythrina* trees though in some places they could have done so. The song (sic) was a combination of the call with three other notes as "q-q-eh."

TAXONOMIC NOTE.

This bird belongs to the *natalensis* group, and naturally one compares it with three possible races: *valida* which according to Lynes extends from Uganda, through Tanganyika and along the Kenya coastal strip (I personally do not accept this last area within its distribution); *kapitensis* of the Athi Plains south to Ukamba, and north to Mt. Kenya, not recorded from the Masai country to the south, but at Simba. We may dismiss the coastal birds, as they bear no resemblance to the Chyulu birds. The race *kapitensis* is said by Lynes to have a perennial dress, and occasionally a non-breeding plumage. We find that the series collected contains 14 adults breeding or just finished; 11 adults in non-breeding dress; eight young in the juvenile sulphured yellow-breast stage. It is interesting to note, then, that on the

Chyulu range, *natalensis* has a seasonal dress, which can be differentiated from the breeding dress; and in this way: that whereas in the breeding dress the margins to the mantle feathers are greyish; in the non-breeding they are sandy or buffy, and so the striping on the back is bolder; the tails in the non-breeding dress are longer. This plumage is not to be confused with the juvenile which has the sulphured underside.

Taken as a whole the Chyulu adults exhibit a stronger, wider, and more black streaking of the head and mantle; the head is boldly streaked and redder, and thus different from *kapitensis*. Nevertheless one old male and two females who have just finished breeding and very much worn are hardly to be distinguished from typical *kapitensis*.

Now as regards the breeding season on the Chyulu Hills. It can be stated that but for parents with young still being fed, the egg-laying period was over by the end of March, thus much earlier than for this race (if we unite it with *kapitensis*) in the northern parts of its range.

Reverting to the presence of a non-breeding dress as found on this range of mountains, it is of interest to note that on Elgon, seven out of 14 birds taken by Granvik had this reversion to a winter or non-breeding dress. One is led to speculate as to whether altitude and thus greater variation in temperature has an effect on the modes of dress. The Chyulu birds have an altitude variation of 5,000-7,200, whereas Lynes says of *kapitensis* "nowhere appreciably off the general level—3,000-5,000 feet."

CISTICOLA BRACHYPTERA KATONAE.

Mottled-back
Grass Warbler.

All through the moorland of the Chyulu range this species was plentiful. Its altitudinal range was 4,000-7,200 feet, but it was invariably associated with grass in proximity to trees; thus we found it frequently in the smaller commencing forest patches, largely composed of a few *Erythrina* surrounded by woody herbs such as *Leonotis*, *Vernonias* and other composites; along the forest edges and so on, but not in the entirely open grass lands.

The nesting season was about at an end, for no nest with eggs were found, but two with week-old chicks; the bulk of the young were either disassociated from their parents or still being attended by them. Not infrequently one noted a party consisting of parents and three young hunting about the herbage at the base of an *Erythrina* clump; if disturbed they invariably flew into the trees from which they protested loudly. I have never found the species so plentiful in any part of its range.

It was noticeable that these birds were partial to one patch of burnt-off bush along the forest edge; the herbs had begun to

shoot again and had reached a growth of perhaps eighteen inches. Searching this new growth I found it to be heavily infested with *Aphids* and a small spiral mollusc and to determine which the birds were feeding on, two were shot. The stomachs contained both *Aphids* and snails.

TAXONOMIC NOTE.

This series of 37 birds indicates that the dress is more or less perennial, that is, there is no marked and strong difference between the breeding and non-breeding plumage; but there is a definite tone variation which is best expressed this way: that the edging to the crown and mantle feathers is darker or lighter but not in any way comparable to the change seen in the *Chyulu natalensis*, for example.

When the Chyulu birds are laid out together with a series from Nairobi area, Nakuru, Naivasha, to Fort Hall and Mt. Kenya, it is at once noticeable that the Chyulu birds are darker, less rufous tinged throughout the upper surface; in fact, in the darker phase (12 skins) I cannot match them with any Kenya highlands bird; on the other hand the lighter phase of the Chyulu birds is very, though not entirely, comparable to the darkest birds from up country. Lynes has noted "a gradual diminution of size and depth of colouration from west to east" and at the same time says: "Birds in the Kenya highlands run quite noticeably larger, *more deeply coloured and more boldly marked above* than those on the plateau eastward." It is of interest to note, therefore, that the Chyulu birds are even darker still.

The wing measurements of Chyulu birds are as follows: Males, 50-54 mm.; females, 46-50 mm.

CISTICOLA ARIDULA TANGANYIKAE. Small Streaky backed Grass Warbler.

Very few of this species were noted on the range. Actually, I was surprised to find even a few, as the range taken as a whole was unsuitable environment for these birds. They were generally noted on the lower lava flows where the grass and herbage was stunted. They were more often seen on the great lava flow between the south end of the range and the southern Chyulus.

GENERAL REMARKS ON CISTICOLA.

It was a surprise to me to find that there were no examples of *Cisticola*, *prinioides*, *galactotes*, *cheniana*, or *cinereola*. The forest edges with their luxuriant fringe of herbs at altitudes of 6-7,000 feet appeared eminently suitable for *prinioides*, whilst the lower slopes at 4-5,500 seemed suitable to *cheniana*.

DICRURIDAE.

DICRURUS ADSIMILIS DIVARICATUS. Drongo Shrike.

These birds were only located in the low country at the foot of the range, 4,000-5,000 feet; in this they were associated with the Black Flycatcher already recorded, and the similarity is very marked. They were particularly plentiful in the old abandoned banana "shambas." On two occasions these birds were noted to take *Belenois severina* (determined by dropped wings) as they flew past the birds' out-look post. They also captured small *Lycaenids* and one *Charaxes saturnus*. A number of *Fulgorids* disturbed in our attempt to capture them were snapped up by Drongos. A small green-headed Lizard, plentiful amongst the Fig trees was also taken from the tree trunks, the birds flying straight to the tree and swerving swiftly just at the point of contact; and, on most occasions, securing the prey. This is in amusing contrast to an occasion on which I watched a Giant Shrike (*Malaconotus*) making an unsuccessful attempt at flying at a lizard who immediately slipped round the tree trunk; the Shrike clambered (one could not call it anything else) round the trunk; by that time the lizard had gone further up, then round. A regular hide and seek followed, the lizard eventually disappeared into a hole in the rotten trunk and there remained. It was really amusing to observe the Shrike looking this way and that, and probably thinking "Where the h—— has it got to?"

PRIONOPIDAE.

SIGMONUS RETZII GRAUCALINUS. Orange-billed Helmet-Shrike.

Three adults and one sub-adult were taken out of a flock of a dozen birds which appeared in the *Erythrina* trees on the western slope of the range at Camp 2 and the lower lava flow below Camp 3. It was apparently the same flock for when encountered on the eastern side at a later date, it was reduced by the number previously shot. The variation in the call note of these birds is remarkable, and when one starts calling, many others join in, so that there is a confusion of notes. They are extremely noisy. Their flight appears weak and rather fluttering, interspersed with gliding, and is never long sustained. At the moment of writing these notes, there is a large flock in the Museum grounds. Friedmann, op. cit., states: "It is a denizen of dense forests . . . This is hardly correct: I have usually noted them in fringing forest, savannah forest, in open acacia park-country in Nairobi township very often, and the Chyulu birds were "taken in scattered *Erythrina* trees," 4,000-5,000 feet.

It is common in the forests around Nairobi. It is one of these curious gregarious species which, even during the nesting season, hang together, and more than a pair will assist in feeding the young at, and after they have left, the nest.

NILAUS MINOR MASSAICUS. Pale-flanked Brubru Shrike.

Absent from the higher zones of the range, this species occurred on the lower zones amongst the *Erythrina* association. An old nest of this species was located in an *Erythrina* tree; it agreed entirely with a previous nest situated in an *Acacia*, found last year, in May, on the Ngong Escarpment.

PRIONOPS POLIOCEPHALA. White-lined Helmet Shrike.

This species was taken on the lower zones of the range during the three weeks May 21st to June 9th. It was not present prior to the first date mentioned and no further examples were noted in the central and southern lower portions of the range.

The birds collected were from two flocks, for my collectors working on different sides of the range both reported the bird on the same day. The series consists of four adults and two sub-adults.

EUROCEPHALUS RUPPELLI RUPPELLI \approx **DECKENI.**

White-headed Shrike.

A few of this species were noted on the sparsely clad lower slopes and the lava flows. They were very conspicuous as they flew from tree to tree, the white head and upper tail-coverts being noticeable features.

In the Chyulu hills, nesting was over by April, young birds in barred plumage being well on the wing. In the Voi area I obtained nestlings in January.

LANIIDAE.

LANIUS COLLARIS HUMERALIS. Long-tailed Pied Shrike.

This common species was met with throughout our safari from Kibwezi to the hills; on the range itself, it was more plentiful on the lower slopes and lava flows where scattered bush and clumps of trees predominated. It was not actually taken in any of the forests, though at 6,500 feet a pair frequented the forest edge by our camp.

LANIUS CABANISI. Long-tailed Fiscal Shrike.

This is a bird of the bush and acacia country and naturally would not be expected to range on to the higher altitudes of the Chyulu Hills. Thus of the five specimens taken, all were

TWENTY-EIGHTH ANNUAL REPORT, BOTANICAL REPORT AND BALANCE SHEET FOR YEAR ENDING DEC. 31st, 1938.

The East Africa and Uganda Natural History Society was founded in the year 1909; its objects were the study of Natural Sciences within Eastern Africa, particularly Kenya and Uganda.

From a very unpretentious start, it has advanced, and throughout nearly thirty years there has been no retrogression. The year now under review is no exception; we are able to report definite progress in many directions.

This Report marks a definite point in the history of the Society, through whose efforts the country has acquired a local Museum of no mean order, and of international importance. From 1939, the Society will cease to administer the Museum; this function will be taken over by a Board of Trustees, appointed under the recently enacted "Museums Ordinance."

Public interest in the Society and its activities has been more than maintained; the membership has slightly increased, whilst appreciation of the Museum, as evidenced by the number of visitors, is definitely gratifying.

Members who attended the last Annual General Meeting or who have read the Report as published in the Journal, will recollect that the Society agreed to maintain and develop the Museum within the Memorial building to the late Sir Robert Coryndon, on a definite basis during the year 1938. Furthermore, Government agreed to our proposal to appoint an Interim Committee to investigate further the financial requirements of the Museum, and to advise on matters connected with the proposed legislation appropriate to museum development and control. This Report has now been submitted to Government, and the appointment of a public Board of Trustees is under way.

MEMBERSHIP.

As already indicated, membership of the Society has been maintained. The income from subscriptions was more than budgeted for and can be considered fairly satisfactory; I use the expression "fairly satisfactory," for I consider that with a little more push from the Executive, the membership can be materially augmented.

This is a matter for future reorganisation.

PUBLICATIONS: LECTURES.

We regret to report the publication of only one Journal during the year. Though small in bulk, it reflected energetic work by certain members of the Society. The Publication Committee has promised to make amends during 1939.

A talk on the recent Museums Expedition to the Chyulu Hills was given in conjunction with the Special General Meeting in December last. We would take this opportunity of thanking Messrs. Melhuish and Beckley for the loan of projectors for use at this meeting.

EXPEDITIONS.

As a result of the generous donation of £500 made by Mr. W. D. Campbell, members of the Museum staff were able to put in a three months' safari to the Chyulu Hills where an ecological survey of the range was carried out. The data and material collected is referred to in the succeeding pages and will be reported on in the Journal during 1939.

STUDY COLLECTIONS.

Accessions to the study material during the year have been far in excess of any recorded during recent years.

The Bird collection was greatly augmented by material donated by Mr. A. M. Champion; by valuable material from the Baringo area by Dr. MacInnes, by material presented by Mr. Moreau, and by a very valuable collection from the Chyulu Hills, taken by the Museum staff. This latter contains many new races which have been and are being described in the pages of the Journal and elsewhere.

The Entomological material has been augmented to a very large degree, so much so that storage room is now totally inadequate to house the collections. The principal donations were from Mr. Jackson of Kitale; Mr. James Gastrell, Mbarara; Mr. MacArthur, Mr. Gedye, Mr. Turner, Dr. MacInnes, and Messrs. G. and D. van Someren, whilst the Chyulu expedition contributed several thousands of all groups of insects, including many new to science. The special work on Fruit Flies has continued throughout the year and many new species will be described in due course.

As hitherto, we have relied on, and are indebted to, Sir Guy Marshall and members of the Imperial Institute of Entomology for the determination of much of the general entomological material, and Mr. Munro of Pretoria has dealt with the Trypetid collections. Prof. Carpenter of Oxford, and Dr. Jordan of Tring and members of the British Museum staff have determined special collections. To these gentlemen we tender our thanks. Our thanks are due to Mr. Gedye for his services in the Entomological room.

The Reptile and Amphibia study material was greatly increased by activities of the Museum staff on the Chyulu Hills, and many private individuals donated specimens.

The Geological collection has been only slightly augmented, due largely to the fact that there is no specialist officer for this division.

As a result of His Excellency the Governor's request to District Officers to collect Ethnological material, a considerable augmentation has taken place in this division. Many of the Native District Councils have taken an interest in the matter and gifts in kind, and cash have been made.

It was not possible to stage any of the material donated, but it is hoped to re-distribute the exhibits on the public galleries, arranging the material by tribes, in the near future. There are still many blanks and we hope that District Officers will continue to assist in building up this section. We tender our thanks to His Excellency and officers of the Administration who have assisted us.

With the appointment of a Botanist to the staff, a fresh impetus has been given to the Botanical section, both as regards study and exhibited material. Mr. Bally was appointed to the post early in 1938 and apart from the special Chyulu material, has contributed a considerable quantity of material from nearby areas. The systematic collections have been re-arranged and augmented, and many coloured drawings of plants have been added. In this last sphere of activity we have been materially assisted by Mrs. Bally, whose work is greatly appreciated. A detailed survey of the progress in the Botanical section is appended in the Report by the Botanist. As a subsidiary activity to the Herbarium, Mr. G. van Someren has undertaken the propagation and cultivation of indigenous Orchids with a view to close study of this difficult but interesting group.

The Mammal section has been added to (very considerably), largely as the result of the expedition to the Chyulu Hills.

LIBRARY.

The co-operation with overseas Institutions mentioned in last year's Report continued, resulting in considerable augmentation of literature, thereby adding to the value of the Library. Owing to lack of funds we were forced to continue with the services of a part-time Librarian. The utility of the Library has thus been curtailed, but the essential contact with institutions has been maintained.

REFERENCE COLLECTIONS.

We have to report an increasing use of our systematic study collections by members of Government Departments and visitors. A very considerable amount of material has been sent in for identification, more particularly in the Zoological and Botanical

sections, and a considerable amount of time of the staff is taken up with this work. Material from the Ornithological collections has been forwarded to the British Museum for comparative work and a reciprocal loan scheme has been inaugurated.

MUSEUM PROGRESS.

One additional habitat group was completed toward the beginning of the year, and has proved a definite attraction. Additions were made to all sections of the exhibited material, including several coloured casts of reptiles and amphibia made by Mr. Allen Turner during the Chyulu expedition.

Dr. and Mrs. Leakey staged a special archaeological exhibit of the more important finds from the "Hyrax Hill" and Njoro excavations. This exhibit is of particular interest and demonstrates a culture which is now determined as pre-dynastic Egyptian, indicating a probable trade intercourse with Kenya at that period.

VISITORS.

The interest taken by the public in the Museum is indicated by the increase in number of visitors. A brief comparative statement is as follows: 1935, 2,200; 1936, 3,906; 1937, 5,099; 1938, 7,000. An analysis of the 1938 figures shows that 3,674 visitors were children of school age; 2,520 adults paid the ordinary entrance fee and 806 members and friends were admitted free.

Distinguished visitors included Their Royal Highnesses the Duke and Duchess of Gloucester and Lord and Lady Baden-Powell. His Excellency the Governor visited the Museum on several occasions.

FINANCE: GENERAL PROGRESS.

The Financial Statement and Balance Sheet indicate a conservative Budget estimate and a careful expenditure of the funds made available. The principal sources of revenue, as hitherto, were Government and the Nairobi Municipal Council. We are appreciative of the fact that both bodies responded to our representations regarding increased support, and we publicly acknowledge our thanks.

The arrangement entered into between Government and your Executive, that the Society should carry on the organisation of the Museum during 1938 on a minimum contribution of £1,700 from sources other than the Society's activities, has been fulfilled on our side, and the deficit in revenue has been balanced by curtailment of certain anticipated expenditure, and a contribution from Society revenue. As announced at our last

annual meeting, His Excellency appointed a representative Interim Committee to further investigate the re-organisation of the Museum, to advise on adequate legislation, and explore possible sources of revenue. This Committee, on which the Society was represented, reported to Government last October. The Report was approved by His Excellency in Council, and the Museums Trustees Bill was presented to and passed Legislative Council in November. The financial side was submitted to Standing Finance Committee early in 1939, and I am authorised to state that the additional funds required have been sanctioned. The Society has agreed to manage the Museum for the month of January, 1939, to allow of the appointment of the Board of Trustees under the Museums Ordinance. It is hoped that this Trust Board will be established and will assume control of the Museum during February.

The cessation of Museum activities will necessitate a re-organisation of the Society's Constitution, and to this end, your Executive has drawn up a revised constitution which will be submitted for approval.

In concluding the Report, we wish to thank His Excellency for his continued support and personal interest; to record our appreciation of the help, both financial and practical, which members of the Society have given; and to acknowledge our indebtedness to those members who have rendered honorary service throughout the year.

V. G. L. VAN SOMEREN,
Hon. Secretary.

REPORT OF THE BOTANICAL SECTION, 1938.

After a three years' vacancy the Society decided to appoint me as Botanist for 1938 as a temporary arrangement.

During the previous three years a number of collections had been received; they were mostly duplicates from the Forestry Department, but among them were other valuable collections, such as a large collection of Uganda grasses, named duplicates of the Agricultural Department, Uganda, a collection by the late Mr. D. B. Burtt from the Virunga volcanoes, a collection by the late Dr. W. Geilinger from Ruwenzori, a collection by Mrs. Douglas Leakey from various localities in Kenya Colony, and others.

The bulk of the accumulated material was dealt with during the first 3½ months of the year. Unfortunately a great number of specimens were found to have deteriorated through lack of attention.

Thus, 30% of Mr. Burtt's Virunga collections, and all of the material collected by Dr. Geilinger had to be discarded.

From April 17th to July 3rd, 1938, the Museum arranged an expedition to the Chyulu Hills. This expedition—which had been made possible by a generous private donation—was conceived by Dr. van Someren and carried out on the lines of team work, in a way that plant, bird, and insect life were studied simultaneously with geological and topographical study. Dr. van Someren, zoologist (assisted by trained native assistants), Mr. Allan Turner as general field assistant, and myself as Botanist, were the three permanent members, while a short visit by Mr. A. M. Champion and Dr. Hitchens supplied some of the essential topographical and geological information relative to the northern section of the range, the remainder being carried out by the staff.

The botanical work was carried out by myself and by my personal boy Teofilo, but the collection of plants was added to appreciably by Dr. van Someren, who contributed mainly Ferns and Orchids. Live specimens of most of these were collected and are now in cultivation at Dr. van Someren's plot in Ngong.

A total of 1,265 specimens was collected on the Chyulu safari, and in spite of the very wet weather during the first month, 100% of the material was saved, owing to a drying stove, especially constructed for the trip.

Plant succession studies were made in several parts of the range, also a transect two miles long through the large forest which covers the southern end of the Chyulus. The results of these studies will be published in the Society's Journal at a later date, after receipt of identifications from Kew.

From May 1st to the end of the safari I had a meteorological station installed, to which an evaporimeter was added at the end of the month, in view of the unusual dew conditions which prevailed on the top of the range. The data collected will appear as an appendix to the Botanical report.

During the last two months Mrs. Bally joined the Expedition and she materially assisted the botanical work by painting wild flowers for the Museum collection; her paintings were on view at the General Meeting on December 16th on the occasion of Dr. van Someren's talk on the Chyulu Expedition.

After our return from the Chyulu Expedition, 300 specimens of Kikuyu plants had to be named urgently in connection with Dr. L. B. S. Leakey's book on the Kikuyu tribe. Thereafter the naming and despatching of the Chyulu material occupied me for the best part of the following three months.

Apart from the Chyulu material, 580 specimens collected during the year by myself and by various other people were named and duplicates sent to Kew.

During the year a total of 1,800 specimens were mounted and incorporated in the Herbarium.

In the Botanical room of the Museum a special exhibit of drawings of Succulents was on view for several months, which was followed by exhibits of paintings of East African Orchids and of *Thunbergia* by Mrs. Bally.

The total of coloured drawings made during the year was 127, mostly by Mrs. Bally, and a number of them have been selected for illustrating the new edition of "Gardening in East Africa."

SYSTEMATIC WORK.

A survey of succulent Euphorbieae is being prepared in collaboration with Prof. Dr. E. Werdermann of the Botanical Museum, Berlin-Dahlem. So far, 45 species from East Africa have been compiled, the material consisting of dried and spirit specimens, 144 photographs, and 19 coloured drawings.

Many of the described species are being grown in a succulent garden which was started during the year on the Museum grounds.

The survey will eventually form part of a comprehensive monograph on the world's succulent Euphorbieae by Mr. Alain White and Prof. Boyd L. Sloane, Summerville, South Carolina, U.S.A.

MEDICINAL PLANTS.

A number of native medicinal plants, especially such with specific action on the heart and on the circulatory system, were

sent to various institutions and firms during the year. One of these plants, containing a toxic principle allied to Strophantine, is now passing through a series of clinical tests, which have so far proved satisfactory.

In the course of the year, determinations of plants were given to:—

The Veterinary Department.

The Agricultural Department.

The Forestry Department.

The Game Department (Fish Warden).

The Scott Laboratories.

The Agricultural Officer, Moshi (Tanganyika Territory).

The Kaptagat School, Eldoret.

and to various private people.

PETER R. O. BALLY.

East Africa and Uganda Natural History Society, Nairobi.

BALANCE SHEET AS AT 31st DECEMBER, 1938.

CAPITAL AND LIABILITIES.		ASSETS.	
	Shs. Cts.		Shs. Cts.
GENERAL FUNDS.			
Surplus, as per Account attached	68,683 57	CASH ON HAND.	
		On Hand	2 65
		On Fixed Deposit	500 00
		On Post Office Savings Bank A/c. 7,191 67	7,191 67
SUBSCRIPTIONS PAID IN ADVANCE			
	120 00		
UNEXPENDED DONATIONS FOR SPECIFIC PURPOSE—			
Admiral Lynes	602 07	Less Bank Overdraft	7,694 32
Less Amount expended	394 18		450 71
	207 89	SUNDRY DEBTORS.	
Prince of Wales	500 00	Subscriptions	1,065 00
W. D. Campbell	10,000 00	E.A. Power & L. Co. deposit	20 00
Less Amount expended	7,825 62	Sundries	1 00
	2,174 38		1,086 00
SUNDRY CREDITORS.			
Gill & Johnson	2,882 27	GENERAL ASSETS (as per Schedule 1).	
	100 00	As per last Balance Sheet	60,647 48
		Additions since	2,394 18
			63,041 66
		Less Total Depreciation	2,587 78
			60,453 88
		JOURNALS OF THE SOCIETY	
		(As per Schedule 2)	3,002 35
	Shs. 71,785 84		Shs. 71,785 84

We have compared the above Balance Sheet with the Books and Papers of the Society, and certify same to be in accordance therewith.

For GILL & JOHNSON,
L. GILBERT.

Nairobi,
31st January, 1939.

ADMIRAL LYNES' DONATION ACCOUNT.

		1938.	Shs. Cts.	1938.	Shs. Cts.
Dec. 31.	To Fixtures for Habitat Group	...	394 18	Jan. 1.	By Balance brought forward
	Balance carried over	...	207 89		...
			Shs. 602 07		Shs. 602 07

MR. W. D. CAMPBELL DONATION ACCOUNT.

		1938.	Shs. Cts.	1938.	Shs. Cts.
Dec. 31.	To Expenditure on Botanical Expdn.	...	7,825 62	Jan. 1.	By Balance brought forward
	Balance carried over	...	2,174 38		...
			Shs. 10,000 00		Shs. 10,000 00

THE PRINCE OF WALES DONATION ACCOUNT.

		1938.	Shs. Cts.	1938.	Shs. Cts.
Dec. 31.	To Balance carried over	...	500 00	Jan. 1.	By Balance brought forward
					...
					Shs. 500 00

CAPITAL FUND ACCOUNT.

		1938.	Shs. Cts.	1938.	Shs. Cts.
Dec. 31.	Balance as per Balance Sheet	...	68,683 57	Jan. 1.	General Funds, as per last Balance Sheet
					...
					66,189 92
					Less Depreciation of assets for the year
					...
					2,587 78
					63,602 14
					4,687 25
					Add Excess Income for the year
					...
					Add Admiral Lynes's Donation amount expended on Fixed Assets
					394 18
					Shs. 68,683 57

Schedule 1. SCHEDULE OF ASSETS AND DEPRECIATIONS.

	As per last		Additions		Depreciation		Nett Value.
	Balance Sheet.		during year.		for year 1938.		
	Shs.	Cts.	Shs.	Cts.	Shs.	Cts.	Shs. Cts.
Aviary	1,523	52	—	8%	1,401 64
Botanical Cabinets	458	46	—	10%	412 62
Cabinets—General	9,634	95	—	10%	8,671 45
Metal Show Cases	13,989	50	—	2%	13,709 71
Wooden Show Cases	1,734	55	—	10%	1,561 10
Furniture	7,436	72	—	10%	6,693 05
Metal Fittings	691	49	—	2%	677 66
Electric Heaters	213	84	—	10%	192 46
Instruments and Apparatus	1,042	87	—	5%	990 73
Miscellaneous Assets	325	10	—	10%	292 59
Books and Library Account	22,198	55	2,000 00	—	24,198 55
Admiral Lynes's Habitat Group	1,397	93	394 18	10%	1,652 32
	60,647	48	2,394	18	2,587	78	60,453 88

Schedule 2. JOURNALS OF THE SOCIETY.

1938.		Shs.	Cts.
Jan. 1, Balance as per last Balance Sheet ... ..	...	5,674	00
Dec. 31, Cost of printing further Journals ... ..	...	724	75
Less Sales ... ..	...	6,398	75
Free Issues to Members ... ..	...	196	40
Used in Exchange for Library additions ... ..	...	1,200	00
	...	2,000	00
Less Depreciation ... ..	...	3,002	35
	...	—	—
	...	3,396	40
	...	3,002	35
	...	—	—
	...	3,002	35

REVENUE & EXPENDITURE ACCOUNT FOR THE YEAR ENDING 31st DECEMBER, 1938.

	Shs.	Cts.		Shs.	Cts.
EXPENDITURE.			REVENUE.		
Salaries and Wages	...	29,473 68	Government Grant	...	20,000 00
Bank Charges	...	40 00	Municipal Grant	...	10,000 00
Insurance	...	309 00	Miscellaneous Receipts	...	393 48
Subscriptions for Periodicals	...	520 37	Subscriptions	...	7,085 00
Light, Heating, and Water	...	671 60	Visitors	...	2,510 58
Miscellaneous Expenses and General Upkeep	...	1,883 99			
Audit Fees	...	100 00			
Transport Charges	...	19 87			
Postages and Telephones	...	759 80			
Stationery	...	260 50			
Free Issues of Journals	...	1,200 00			
Bad Debts (on subscriptions)	...	63 00			
Balance, carried to Capital Account	...	4,687 25			
		Shs. 39,989 06			Shs. 39,989 06

collected on a lava flow on the western side of the range where scattered *Acacias* and species of *Celastracea* and *Erythrina* were the only trees.

MALACONOTUS POLIOCEPHALUS APPROXIMANS.

Giant Yellow-breasted Shrike.

This Giant Shrike was quite numerous in the small valley or donga patches of forest, and in the lesser true forest, and in the *Erythrina* associations. Its clear note was often heard at the lower elevations. It was not observed above 6,000 feet; at this level only once, the majority were between 4,000-4,500 feet. Several of the stomachs dissected contained lizards, grasshoppers, Fulgorids, and other Hemiptera.

TAXONOMIC NOTE.

MALACONOTUS POLIOCEPHALUS and allied races.

In attempting to fix the racial form of the Giant Shrike of the Chyulu Range, I have once again gone into the question of the type locality of the race described by Cabanis, in Von der Decken's "Reisen in Ost Afrika, 1869 (a copy of which is before me). In this work it is given as Dalaoni River (not Dalaon, as quoted by Sclater and Friedmann). I cannot find the exact place in any map I have consulted.

It has been suggested to me by Moreau (in lit.) that this place probably "refers to Daluni, a camping place at the extreme north end of the Usambara (east) on the caravan route to Kilimanjaro, along the north side of the block." If this is accepted as correct, it clarifies the position. For in this region we find the race maintaining a distinct type of plumage, whereas, at the southern end and on the western side we find transitional examples toward *hypopyrrhus* or *blanchoti*, whichever name is acceptable for the southern race (Austin Roberts uses the former): The Chyulu birds may be placed as the race *approximans*, Cab. Friedmann states (*Bull.* 153 U.S. Nat. Mus., p. 308) that the race which extends to Kikuyu (Nairobi, Kiambu) is *approximans*. My material from these localities are not of this race, but similar to Morogoro birds which are *hypopyrrhus*.

With additional material, I am able to suggest that the southeastern race passes north through Tanganyika Territory and enters the southern Masai country reaching Ngong, Nairobi, Kiambu, and Kikuyu.

The coastal race *approximans* extends from the coastal belt north to Ukamba, and toward Mt. Kenya, and up to the east of Kilimanjaro passing eastward to Lamu and Southern Somaliland.

The wing measurements of the series representing this distribution are as follows:

Coast: Vanga-Mombasa-Lamu, 105-112 mm.; Vanga-Taveta-Chyulu, 105-117 mm.; Tana-Kitui-Meru, 105-116 mm.; Juba River, 108-116 mm. (mostly 113 mm.).

Friedmann, op. cit., gives 95-112 for this race, but many are over his maximum. According to this author, the Marsabit birds should be the race *schoanus*, with wings of 117-122, but his smallest bird is 110 (Ndoto); thus there is a discrepancy in this and his minimum. My Marsabit material measure 110-120; they may be placed as *schoanus*. Turkana-Turkwell birds run larger, 118-122 mm., and are in many cases the intergrades between *schoanus* to the north-east and *catharoxanthus* of the Nile Valley and Uganda. I was unable to distinguish these from the type and series of *interpositus*, Hartert, with which I compared them at Tring in 1922. This name appears to apply to intergrades between *poliocephalus* and *hypophyrus*?

It is unfortunate that Friedmann should not have brought his notes and comments, in his valuable work, up to date, when making reference to publications of other authors. This is markedly the case when he refers to *Chlorophoneus nigrifrons* and *abbotti* groups, and in others, as has been pointed out by Moreau, *Ibis*, 1938, pp. 593-597.

TSCHAGRA SENEGALA ARMENA.

Black-crowned Red-winged Bush Shrike.

The Greater Red-winged Bush Shrike was plentiful in suitable localities along the range. It was not found in the forest and wherever noted was limited to the lesser clumps of bushes and *Erythrina* associations, in the more open small starting forests. The altitude range was thus 4,000-5,500 feet. Favourite localities were the small craters or "blow-holes" which were overgrown with *Euphorbia* and bush with stunted and small trees of *Catha edulis*. One very often found them in the grass lands away from bush, usually along some buffalo path; they were here because along these trails were numbers of beetles and other insects making use of the paths for easy travel; again along these paths various animals dropped their dung, serval cats for instance, and as one knows, these droppings soon attract various *Scarabeids*, and these are relished by the Shrikes.

TAXONOMIC NOTE.

I do not wish to enter into a discussion of the validity of the various races I admit to the Kenya-Uganda list, but would draw

attention to Friedmann's suggestion that the East African birds hitherto accepted as *armenus*, type locality Taveta, are identical with South African birds, named by me *confusus*. It is true that Oberholser linked the Taveta bird with those of South Africa and proposed a name which included both, but the type cited is a Taveta bird, and he appears to have had only one S.A. specimen, P.U.S. Mus., Vol. 130, p. 810.

To test the statement that South African birds are not distinct from Kenya specimens, I have had the loan of 41 specimens of *T. senegala* from the Transvaal Museum, through the kindness of Dr. Austin Roberts. In all, I have before me 132 birds. Whilst it is true that individual Kenya birds can be matched with S.A. material and vice versa, in the series it is noticeable that the southern birds are darker, more generally suffused with grey on the underside than are the Kenya specimens. Furthermore, omitting the accepted coastal race *orientalis*, type locality Mombasa, we find on measuring the wing and tail lengths that the southern birds run larger. Thirty-six birds give the following: Wings, 86-92 mm.; tails, 103-112 mm. in the following ratios: Wings, 3 of 86, 4 of 87, 2 of 88, 13 of 89, 12 of 90, 3 of 91, 2 of 92; tails: 1 of 103, 8 of 104, 5 of 105, 18 of 106, 4 of 108, 2 of 110, 1 of 112.

Twenty-four Kenya highland birds measured as follows: Wings, 80-89 mm.; tails, 90-100 mm. in the following ratio: 1 of 80, 1 of 81, 1 of 82, 2 of 83, 1 of 84, 3 of 85, 6 of 86, 3 of 88, 1 of 89; tails: 1 of 90, 1 of 91, 2 of 92, 2 of 93, 5 of 95, 3 of 96, 2 of 97, 1 of 98, 2 of 99, 1 of 100.

Apart from general colour differences as noted, we have the additional support of size. Although the type of *armena* is one of the intermediates toward the coastal race *orientalis* I support the use of this name for the Kenya highland race.

I have now to refer to the remarks on this species in Jackson's Birds of Uganda (Sclater, 1938), for they are an extreme view, viz., that only one race is recognisable from Senegal across Africa, excepting N.E. and south to the Cape. So far as the southern birds are concerned, I would refer readers to the foregoing table and remarks. To test out the statement that only one race is recognisable in Eastern Africa, I have again laid out my very large series of nearly 200 skins. There is not the slightest doubt that all along the coastal belt from Lumbo, P.E.A., to the Juba River the birds are very white below, and the inland birds are darker and greyer. The coastal birds are certainly divisible into three races; South Somaliland and Jubaland *catholeuca*, Neum., meeting with *orientalis*, Cab., in the Lamu area, this race extending southward to beyond Dar es Salaam; along the coast of P.E.A. the race *mozambica*, van Som. occurs.

I therefore see no reason to depart from my previously published opinion.

TSCHAGRA AUSTRALIS. Subsp. Chyulu Lesser Red-winged Bush Shrike.

The Lesser Red-winged bush Shrike was plentiful toward the northern portion of the range along the forest margins. It was very retiring in habits, keeping to the thick tangle of bush and creepers which surrounded most of the forest patches.

TAXONOMIC NOTE.

I have compared these Chyulu birds with a long series from the coastal strip, paratypes of my race *littoralis*, and find them to differ in the following respects: Mantle generally darker, red-brown; crown also darker; but the underside very strikingly white on the throat, mid breast and abdomen contrasting with the flanks which are ochreous-grey with a wash of olive.

The race *littoralis* is described as a smaller, much paler race compared to the inland *minor* and *emini*; the Chyulu bird is darker above and whiter below.

DRYOSCOPIUS CUBLA. Puff-backed Shrike.

This species was exceedingly plentiful in all parts of the range and was found throughout the forests, even to the depths of the Great Chyulu Forest. Friedmann writes (*Bull.* 153, U.S. Nat. Mus.) that the birds live in open woods and not in dense forest. This is not strictly correct; it occurs in both, in Kenya. It was noted in the canopy and mid-zones of the forest, and was often seen associated with other species as part of a "bird party" in an organised "drive" through the tree tops. Chyulu birds had finished breeding on April 24th.

TAXONOMIC NOTE.

I have dealt at length with the variation in this species as it occurs throughout Kenya (*Nov. Zool.*, 1938) indicating that along the coast the race *hamatus* tends to become smaller. I gave comparative figures of the material then available showing males to have wings of 78-89 mm. Friedmann refers to this paper in another connection but does not give these figures, but others, based on lesser material in 1922. Since 1932 additional material has come to hand and corroborates my previously expressed views: Mara River-Sotik-Mau birds run up to 89 mm. (six examples) and now further material from the coast gives males not exceeding 83, most below 80. Of the Chyulu birds (adults) 16 males run from 79-82, eleven are 80 mm.; only three are above the 80 mark.

It would be interesting to know more of the topotypical Umyamwesi bird, for this locality is after all a long way from the Kenya Highlands. Such topotypical material would have to be examined in long series before one could state definitely that the coast birds were consistently smaller.

LANIARIUS FERRUGINEUS CHYULU. Subsp. Nov.
Chyulu Pied Shrike.

On the Chyulu Range, wherever there was thick cover in the form of dense marginal forest growth, or in spots in the forest where lianas had massed the vegetation together into an almost impenetrable growth, this Pied Shrike was sure to be found.

If not seen at once, its loud call, often a duet between the two birds, was heard on every side. Quite often as one was searching the mass of lianas at the top of some tree in the hope of obtaining a glimpse of a Bar-throated Warbler, one would see a movement; one shot at the spot, and in a moment down would come one of these birds; its presence hitherto undetected, for they are not always noisy. I have watched a pair working about on the top of a creeper-clad tree for moments on end without a sound.

Usually, however, if the birds have been disturbed, they will scold and from excitement commence calling as soon as they have gone into cover. This bird is equally at home in all strata of the forest, even on the ground, for when they are working thick tangled marginal growth they frequently come to ground, but I have not observed them doing any actual searching on the ground for any length of time. The usual note heard is a loud far-reaching "pi-you-hoo" not actually three distinct notes, but three run together so as to give a cadence and intonation as described. Sometimes the note is a quavering "p-o-o-o-o." Examination of stomach contents showed these birds to take a variety of insects, spiders, young mice, and land mollusca, of quite fair size but always broken up.

The Uganda and Kenya highland race have been seen by me to take eggs and young birds of other species, but the Chyulu bird was not detected in the robbery: the nesting season was over by April.

Apart from actually taking mice from nests, as I have witnessed, I caught a pair of these Shrikes in the act of destroying a small mouse which had been caught in a trap set for it in a tree. Although the Chyulu bird was extremely retiring, that is, it kept to the thick portions of vegetation, I not infrequently saw them at the forest margin taking grasshoppers. They would work along the vegetation until a grasshopper was seen; a bird

flew out, seized the insect and retired immediately. All young seen were strong on the wing and no nestlings were noted.

TAXONOMIC NOTE.

For purposes of comparing the Chyulu birds I have set out all available material of this species throughout its range in Kenya, some 180, not including birds from Chyulu. I have considered this material in the light of the remarks on the group, by Friedmann, *Bull.* 153, U.S. Nat. Mus., and the arrangement given by Sclater in his "Systema."

Omitting Uganda material, which is accepted as *L. f. major*, characterised by having the middle upper wing coverts, the inner greater coverts and inner secondaries with white, we find that birds from Elgon, Maraquet, Cherangani, Kaimosi, Mau to Sotik and Rongai, Nakuru to Naivasha are of this type, with in the last named two localities intergrades towards *ambiguus*. Two Aberdare birds show the same extensive white areas and cannot be distinguished from *major*.

According to Friedmann these Aberdare birds should be *aethiopicus*. The wing measurement of the above-recorded birds are as follows: Males, 99-102 mm. (Naivasha-Nakuru), 100-105 in birds from Mau; Kericho, Sotik, 103-107 mm.; Elgon-Kaimosi, 98-100 mm.

Examining the Nairobi-Kyambu material, we find evidence of the influence of *major*. Three birds are indistinguishable from that race in respect of the amount of white on the wing; one has less white on the coverts, but still retains it on the inner secondaries; seven birds are similar to *ambiguus* of Kilimanjaro. Males 96-99 mm., females 90-96.

MARSABIT BIRDS.—Nine specimens from this locality give the following measurements: Males, 96-99 mm.; females, 90-96 mm. They are *aethiopicus*. Friedmann suggests that the Meru (Kenya) birds are *major*, but as these have the white limited to the middle wing-coverts they cannot be *major*. Actually, they are intergrades between *aethiopicus* and *ambiguus*. Topotypical *ambiguus* in my collection have wing lengths of 99 in males and 93 in females; but Friedmann gives 85-96 for this race. Birds from Lumbo measure 88-96 mm., but Friedmann gives 90 mm.

The only other described race within Kenya is *sublacteus*, which is a coastal form, with no white on the wing. This race extends inland through Tsavo and Teita to the base of Kilimanjaro.

Having defined the races as above, we find that the only race comparable to the Chyulu birds is *ambiguus*.

DESCRIPTION: Like *ambiguus* in that the white of the wing is limited to the middle coverts, they differ in having the whole of the upper side decidedly green-black, not blue-black; the throat is pure white and contrasts strongly with the very rich pink-buff of the breast and sides, more so than in any East African race. In size they agree with *ambiguus*. Type: male, Chyulu Range, 18/6/38, alt. range 5,000-7,200 feet in forest. Coryndon Museum Expedition, 1938. Twenty-two specimens were collected. Limited range, the Chyulu Hills.

LANIARIUS FUNEBRIS DEGERER \lesssim ROTHSCHILDI.

Sooty Bush Shrike.

Though very numerous in the lower plains round the mountains very few of these birds appeared to ascend to higher than 5,200 feet. Three adults and two immature in different dress were obtained. The young were still with their respective parents.

They have a very loud piercing staccato call which they utter when at all excited, a variation of four notes, first one, then followed by three in rapid succession. On the range they only occurred in the bush and *Erythrina* associations, or in the old cultivations at the foot of the hills.

TELOPHORUS QUADRICOLOR NIGRICAUDA.

Crimson-throated Green Shrike.

Two specimens of this very decorative bird were obtained at the 4,000 foot level; it cannot, however, be called an inhabitant of the range proper but rather of the adjoining plains.

CHLOROPHONEUS SULFUREOPECTUS SUAHELICUS.

Orange-breasted Scrub Shrike.

Here again we have a bird of the plains, i.e. the lowland bush and savannah forests extending partly up the range. A few were obtained in the *Erythrina*-bush-association of the lower lava flows, up to 4,500 feet.

PARIDAE.

PARUS ALBIVENTRIS \lesssim CURTUS.

Chyulu White-bellied Tit.

The White-bellied Tit occurred in the lower *Erythrina* scrub zones and only reached an altitude of 5,000 feet. A pair used to go to roost every evening in the broken end of a branch of *Cussonia* just near Camp 1. There was always a lot of chatter before they finally settled down. They were noted to seek for

food almost entirely amongst the lichen-clad branches of the before-mentioned trees and were seldom seen at the forest edge. On occasions one saw them forcing open the pods of the *Erythrina*, and on investigation I found the seeds to be badly infested with larvae of a beetle; doubtless the birds were after these.

TAXONOMIC NOTE.

I have designated these birds as intermediates between the smaller coastal race and that of the highlands. I find on measuring up the wing length of the Chyulu birds that they do approach the smaller race, since that form was based on size alone, in that they vary from 76-83 mm., only one bird out of six reaching 83; the others are 76-78 mm. females, 79-80 mm. males. It is unfortunate that the type of *curtus* was from Taveta for the actual coast bird are the smallest members of the race.

PARISOMA BOHMI.

Black-collared Tit-Warbler.

These little Tit-Warblers were quite plentiful on the lower zones amongst the *Acacia-Erythrina* trees and scattered bush of the lower lava flows. As this type of country was rather intermittent, being broken up by intruding lava cones and craters, it was difficult to ascertain its relative abundance at any one level. In its behaviour it is somewhat tit-like yet at the same time one is inclined to associate it more with the Warblers. I have not noted this bird to creep and twist about the branches as do the Tits, nor have I seen them cling to a trunk to pick at a hole in the bark. Their general field characters associate them with the Warblers rather than with the Flycatchers as tentatively arranged in the "Systema."

I would draw attention to the fact that the two Chyulu specimens differ from a series of 12 from the Samburu-Simba bush country (along the railway) by being markedly clearer grey above. The specimens were taken in the *Erythrina* association at 5,000 feet.

ORIOLIDAE.

ORIOLUS MONACHA KIKUYUENSIS \geq REICHENOWI.

Chyulu Black-headed Oriole.

The Black-headed Oriole was surprisingly restricted in its distribution along the Chyulu Range, for we only met with it at the north and central portions and it was not even heard in the Great Chyulu Forest. Even where it did occur, it was not as a forest bird, but was always located in the more scanty forest patches . . . commencing forest . . . and among the *Erythrina*-

Cussonia associations, as well as the stands of *Catha edulis* growing near the now deserted banana "shambas" along the lower zones and at 4,000 to 5,000 feet.

There was nothing distinctive in the behaviour of the birds which had not already been noted.

The systematic position of these birds is interesting, for they constitute part of the aggregate of intermediates between the large highland race *kikuyuensis* and the small coastal-Jubaland birds, *reichenowi*. In type of plumage they are less washed with yellow on the mantle, more greenish, than the majority of coastal birds, nor do they exactly resemble the highland form. In size of wing they are intermediate between the two: 122-134 mm.

ORIOLOUS AURATUS NOTATUS, Peters. Southern Golden Oriole.

Two birds were noted and one obtained at Camp 2, 5,200 feet. The specimen is a sub-adult male and shows the replacement of the striped breast feathering for the uniform yellow of the fully-fledged adult. They were noted in "commencing forest."

CORVIDAE.

CORVUS ALBICOLLIS. White-neck Raven.

At different portions of the range one could count on seeing a pair of these wily birds; at each of our standing camps a pair was noted as frequenting particular patches of forest as roosting places. Each had its dead tree standing out from the rest of the forest growth. During the day time, the birds used these vantage points to scour the surrounding country for possible food. They became aware almost at once when any dead animal was being gutted or skinned. One could hear their raucous call from a far distance as a pair, flying over different parts of the hill sides, called to each other. One old nest was located in a cliff face where the lava had faulted and slipped down some fifty or more feet. Though largely carrion feeders, they will also take beetles and the larger Grasshoppers and locusts. A pair at Camp 1 were the means of recovering a wounded Guineafowl which had got away the previous evening just at dusk. It became too dark to search for the bird the evening it was shot and search was made early next morning in the direction it had gone off. The Ravens had already spotted the bird and were chivvying it in the long grass, swooping down and striking with their powerful bills and causing feathers to fly. The bird was rescued and put out of its misery, while the Ravens kept their distance, well out of gun shot. They allow one to approach comparatively near if one is unarmed, but if a gun is carried they know what is a safe distance.

Like others of the Crow family, these birds will search over ground which has been recently burnt, in the hope of finding some half-scorched rodent, frog, or lizard.

STURNIDAE. Pholia.

PHOLIA FEMORALIS, Richmond.

Buff-bellied Purple
Starling.

On two occasions this small starling was noted in large flocks 100 strong within the Great Chyulu Forest but it did not seem to occur at the northern end of the range. This may be accounted for to a large extent by the fact that the particular species of tree on the fruits of which these birds were feeding was not found at that end. The fruits are those of *Cornus volkensii* and the trees, at the time of our visit were heavily laden. In the narrative introductory to the systematic records, I have mentioned the fact that this tree grew in abundance on the high ridge of Chyulu at 7,200 feet in the form of a natural avenue on either side of the ridge, and it was here on the two occasions I visited the peak that *femoralis* was abundant. On the first occasion my attention was drawn to the birds by their continuous whistling notes, many birds taking part in the chorus. The call of six notes was, three in ascending scale then down the same three to one below the first. After listening to the birds and watching their behaviour for about half an hour I shot a pair, whereupon the whole flock swept out of the trees and away to the south end of the great forest. We waited for an hour for their return but they did not put in an appearance. On the second occasion the birds were in the same trees, but an unfortunate premature shot by one of my native boys drove the flock off before any more specimens could be obtained. I was particularly anxious to obtain further material, for the species has only once been previously recorded from within the Kenya boundaries, at Kikuyu Escarpment in 1903 by the late W. Doherty, though the bird is plentiful on Kilimanjaro. It is of interest to note that the particular species of tree on which the birds were feeding is recorded from the Kikuyu Escarpment and eastern Aberdares, and is associated with the damp rain forests at high elevations (according to Battiscombe, 8,000-9,000 feet). The bird occurs on Kilimanjaro from 6,000-10,000 feet; on Chyulu, at 7,200 feet. Like many of these Starling, *femoralis* is wasteful in method of feeding; just as many berries are dropped as are eaten. Not all the birds noted on the first occasion were feeding, many were sitting in the sun-lit branches preening themselves, or whistling lustily. A point of interest is that this species is said to replace *P. sharpii* of Elgon and the Mau and Aberdares, on Kilimanjaro (Moreau,

P.Z.S., Jan., 1936), but we record *sharpii* from the Chyulu. It is quite possible that the species will eventually be found on Kilimanjaro. One must keep in mind that these birds are great local migrants, moving for purposes of food.

We were anxious to secure further material of *femoralis* and carefully examined all trees where starlings were feeding and more than once we were mistaken in naked-eye identification of birds which, on the tree tops, looked like it. The most confusing was *B. l. kilemense* which has a general scheme of black with white belly as in the starling, and quite a few were shot in error. With glasses it was of course possible to note the white head streak and the thick bill of the Barbet.

PHOLIA SHARPII, Jackson. Buff-bellied Blue Starling.

On the southern end of the Chyulu range, we noted one large flock of these birds which came to feed on certain trees then heavy in fruit, and from it we obtained a small series. They are indistinguishable from Elgon-Mau birds, except in point of size: 95-100 mm. as against 100-106 mm.; shorter tails which are less forked. The Chyulu material is insufficient to say more.

The occurrence of this bird along with *femoralis* is of particular interest. The tree on which they always fed, usually toward the late afternoon, was a species of *Sapium*. It was also frequented by Barbets, Bulbuls, and Thrushes.

The fruits were for the most part toward the ends of the pendent branches and these starlings were adepts at sidling down a twig to the tip and stripping the fruits off; their skill was in strong contrast to the heavy and clumsy antics of the Pied Barbets, *B. l. kilimense*.

These birds were less vociferous than either *femoralis* or *C. leucogaster*, which latter was also seen feeding on *Sapium*.

CINNYRICINCLUS LEUCOGASTER. White-breasted
Violet Starling.

Pairs and small flocks of these birds were noted throughout the range from 4,000 to 6,500 feet. With the exception of the flock which fed on *Sapium* berries, most of the birds were noted to feed on species of *Ficus*. They are very noisy, not so much that the call is loud, for it is not, but incessant. On some of the wide-spreading figs the whole canopy would be a moving mass of these birds, most of them either busy feeding or whistling in a most jumbled manner; a clap of the hands, not sufficient to drive them away would bring the singing to a sudden stop, to be renewed in a few moments.

The only specimens obtained are immature or female and I have therefore not treated them racially. I have commented on

the value of Bowens' *lauragrayae* in *Nov. Zool.*, XXXVII, 1932, and cannot support it; additional material endorses this view. It is of interest to note that in 1936 Loveridge and Peters definitely sink this race, yet in 1937, Loveridge in conjunction with Friedmann, *Bull. Mus. Comp. Zool.*, admits it. In 1933, Bangs and Loveridge in the same Journal, admit it. Friedmann in *Bull.* 153 U.S. Nat. Mus., p. 331, admits it but refers to my measurements of an exceedingly long series but does not seek to interpret them as indicating instability of the supposed characters on which the race is founded. Why? Sclater and Moreau doubt its validity, and I have no hesitation in making it a synonym.

ZOSTEROPIDAE.

ZOSTEROPS CHYULUENSIS. Sp. Nov. Chyulu White-eye.

A very long series of these birds was taken in order to ascertain the stability of characters which appeared to indicate these birds as a hitherto unknown race or even species. Seventy specimens were obtained. Taxonomic notes will be appended.

This species of *Zosterops* frequented the forests at altitudes varying from 7,000 to 4,500; below this there occurred the smaller *Zosterops senegalensis flavilateralis*, Reichw., which is an inhabitant of the thorn bush and savanna forests. The two thus have entirely different ecological habitats.

The Chyulu *Zosterops* is a bird of the forest canopy for the most part, more particularly in the larger forests where there were no more or less open glades or clearings. This was particularly noticeable in the mornings up to the early afternoon; after this hour, as the sun was at a slant, one noted the birds among the trees along the forest edge, more particularly those which were heavy with beard lichen and with the evening sun directed on to them. Another favourite feeding resort was among the giant *Lobelias* which grew at the forest edge just within the border of bush which was composed largely of *Vernonia*, *Leonotis* and *Pentas*. A pair of birds would work systematically from the bottom to the top of a flower spike (many of them 10 feet and more long) ascending the stem in spiral fashion. I was particularly interested in the probable food obtained from these flowers and ascertained that both nectar and insects were taken. At the same time, stomach examination showed that the birds fed also on small berries as well as larvae of various sorts and spiders.

The diet is thus a mixed one. In captivity I have found that *Zosterops* are partial to *Aphids* and scale insects and will readily eat banana and other soft fruits. As with most of the species, these birds are gregarious to a certain degree, and from my observations it would appear that flocking does not occur through-

out the whole day. In one small forest patch one noted perhaps two or three pairs hunting in couples but toward the late afternoon these pairs would be joined by twenty or so additional birds and all, in association with other species would hunt over a large lichen and moss-covered tree just at the back of our camp; this was particularly the case if there had been a shower of rain in the morning or early afternoon. One nest of the species was located in a small tree (*Catha edulis*) growing at the edge of a forest patch. It was composed entirely of beard-moss lightly woven and very flimsy and slung between a horizontal fork. A broken egg shell, pale blue in colour, found not far from the nest indicated that the nest had been robbed, probably by a rat or Shrike. As there was only the one species of *Zosterops* in the hills, the nest could only belong to this bird. It was noted that all the birds obtained during mid-April to mid-May were in moult, on tail and primaries and about the head, less so on the body. As young birds were on the wing I concluded that the nesting season had ended in March. In contrast, all birds shot toward the end of May and throughout June and July were in beautiful fresh plumage. Only one male shot on 21st April had slightly enlarged gonads.

TAXONOMIC NOTE.

The Chyulu *Zosterops* is very distinctive when compared with its possible near allies. Geographically, it is nearest to *eurycricotus* of Mt. Meru and Kilimanjaro, but it needs no comparison with this race which is very dull coloured. *Usambarae* to the south is small and does not possess a large white eye-ring. To the westward, however, in the Mbulu district of Tanganyika Territory we find the recently described *mbuluensis* of Sclater and Moreau. Through the kindness of Mr. Moreau, I am able to compare the Chyulu birds with that race. In the comparative notes on the races of *Z. virens* published by Sclater and Moreau in *B.B.O.C.*, Vol. lvi., pp. 14-15, we are informed that the race *mbuluensis* ranges east as far as the Pare range, S.S.E. of Kilimanjaro, Moreau (in lit.) informs me that *mbuluensis* and *eurycricotus* occur together in part of their distribution and are now considered to belong to two distinct species.

This supports my view that there has been too much lumping into one species, *virens*, as was done by Sclater in the "Systema," and again in the *B.B.O.C.*, Vol. lvi, cited above.

DESCRIPTION: Nearest to the race *mbuluensis*, Sclater and Moreau, the brightest male of which is about equal in colour to the female of the Chyulu bird, on the underside; but the upper side is not so washed with yellow, nor is the yellow so rich or

extensive. In *mbuluensis* the yellow of the forehead is restricted to just at the base of the bill and a wash over the fore-part of the crown; in *chyuluensis* the yellow is richer and extends to the fore-part of the eye and is carried back as a supercilliary stripe to almost the posterior side of the white eye-ring. The whole upper side is more strongly washed with yellow, while the underside is a rich canary yellow, with a slight wash of green on the sides of the breast and flanks. The very bright underside is a characteristic feature, as well as the extension of the yellow supercillium.

Sclater compares the Mbulu bird with *kikuyuensis* and so far as this compares with the Chyulu bird, one need only remark that the latter is far richer yellow on the underside and the yellow of the fore part of the head is richer, but not so defined. The Chyulu bird requires no comparison with *jacksoni* except to indicate that *jacksoni* has only a narrow white eye-ring and is a generally duller bird. The only point of slight similarity is in the distribution of the yellow on the forehead, but the colour is different.

Type: Male, Chyulu Range, Camp 3, 26/6/38, altitude 6,800 feet, Chyulu Great forest. Coryndon Museum Expedition, 1938.

REMARKS: Forty-two males and 29 females were taken. Wing measurements of this very large series are as follows: Males average $64\frac{1}{6}$ mm., variation 62-65 mm.; females average 61 mm., variation 58-63 mm. Seven males, 63 mm.; 10 males, 64 mm.

As I have dealt with the wing measurements of this bird in some detail it is as well to refer to a remark by Sclater and Moreau (*B.B.O.C.*, lvi., p. 15) to the effect that *jacksoni* and *usambarae* are small birds. This is true of the latter, but topotypical *jacksoni* give the following wing measurements: Males, 62-66 mm., as follows: 3 of 66, 2 of 65, 2 of 64, 3 of 63, 1 of 62 mm. Females: 58-63.

They are thus just as large as *chyuluensis* or *mbuluensis*.

In passing I should like to place on record that a specimen of *Zosterops* from "Merikitabu"—Pargitabak, Southern Masai area, N.W. of the Nguruman range, is identical in colour with *usambarae* but has wings of 59 mm. It also bears a resemblance to *garguensis*, Mearns, but is readily distinguishable from it.

The general grouping of East African *Zosterops* which I adopt in my systematic series is as follows:

GROUP 1.—Characterised by their general large size, large white eye-ring. Entirely forest birds.

Kikuyuensis.—Distribution, Mt. Kenya, Aberdares, Kikuyu and Ngong forests.

Chyuluensis.—Distribution, Chyulu Mountains.

Mbuluensis.—Distribution, Mbulu district (highlands of the Great Craters), Kitumbeni, and Longido, and probably Pare (these seem very close).

Euryericotus.—Distribution, Mts. Meru and Kilimanjaro.

GROUP 2.—Characterised by a small eye-ring, variation in size from the smaller savannah races to the alpine forms.

Jacksoni.—Distribution, Mau to the Cherangani range.

Elgonensis.—Distribution, Mt. Elgon.

Yalensis.—Distribution, the open savannah and park country of the Yala and Nzoia valley.

Stuhlmanni.—Distribution, the orchard forest and savannah country and more open forests of Uganda to Mt. Moroto, Turkana.

Garguensis.—Distribution, the scattered forests on the tops of hills in the Northern Frontier, Uraguess and Marsabit.

? ? Distribution, open steppe forest of the southern Masai Reserve. Parigitabak.

Usambarae.—Distribution, Usambara Range, and probably further south (Moreau, in lit.).

GROUP 3.—Characterised by their general small size; hardly any white ring round eye; bright yellow, though paler underside.

Jubaensis.—Distribution, Juba River Valley.

Flavilateralis.—Distribution, the thorn-bush and steppe forests through southern Ukambani to the plains country round Kilimanjaro.

Fricki.—Distribution, the park and acacia country of the Kenya highlands, not in forest.

Superciliosus.—Distribution, northern Uganda to Lake Albert.

GROUP 4.—Characterised by grey undersides.

Winifredae, Sclater and Moreau. Distribution, South Pare, bush; white eye-ring small; paler abdomen; frons and throat yellow.

Silvanus, Peters and Loveridge. Distribution, Mt. Mbololo.
More uniform grey underside; large white eye-ring;
yellowish-green throat. Forest.

I have purposely refrained from designating the above as races of so many species, for I feel that we have even now insufficient data on which to group them into species, with the exception perhaps of those usually associated with *senegalensis*.

NECTARINIIDAE.

NECTARINIA FORMOSA AENEIGULARIS.

Long-tailed Emerald Sunbird.

This species was very common throughout the whole of the moorlands of the range. I refer to the moorland, as it was not an inmate of the forest but of the forest edge and the scattered bush among the grass lands. It was ever present, even when the hills were covered in dense mist one could dimly see these birds flitting from one clump of *Gladiolus* to another, or hear their sharp piping call. Two species of plants were much sought after, the beautiful orange and salmon *Gladiolus* so plentiful in the grasslands or the soft leafed *Leonotis* which grew in abundance along the forest edges and around the *Erythrina* clumps; they definitely preferred the former. They were undoubtedly more plentiful at the higher altitudes of 7,000-6,000 but one also found them at 4,500 feet.

Quite a number of nests were found, usually low in a clump of *Leonotis*, or amongst the leaves of the Chyulu Blue Lupin. A considerable quantity of vegetable wool is used in the construction of the nest, both as a lining and in the body-work. The outer frame was almost entirely grass and bark fibres. Most of the "wool" was from *Asclepiads*, *Marsdenia*, and *Clematis* with a mixture of composite heads. No eggs were found, but one nest had a nestling.

NECTARINIA KILIMENSIS.

Long-tailed green-bronze
Sunbird.

This species was found throughout the range and was everywhere plentiful along the edges of the forest and even more so in the lesser forest clumps and the lower levels where bush and *Erythrina* were plentiful. It kept at a lower level than most of the Sunbirds, and roughly speaking its main strata appeared to be 4,000-5,800 feet.

NECTARINIA (DREPANORHYNCHUS) REICHENOWI.

Golden Long-tailed Sunbird.

Another very common bird, but inclined to range rather higher than *kilimensis*, thus it was plentiful at 6,000-7,000 feet.

I have already mentioned that the Emerald Sunbird was very partial to *Gladiolus*, but this species was seldom noted at these plants; it kept almost entirely to *Leonotis* and various *Acanthaceae*.

CHALCOMITRA SENEGALENSIS LAMPERTI.

Red-breasted Black Sunbird.

A bird of the open country for preference, where the *Acacias* and *Erythrina* flowers give ample support. They feed largely on insects and flower juices, from these trees, but one may often observe them in the forests; thus they were noted to frequent the large white flowers of *Connophyringia*.

CHALCOMITRA AMETHYSTINA KALCKREUTHI.

Violet-throated Black Sunbird.

Many were observed along the edge and in the more open forests. It also occurred on the lower lava flows of 4,000 feet.

CINNYRIS MEDIOCRIS.

Chyulu Olive-bellied Sunbird.

All along the edges of the forest and in the ravine forests this species was plentiful and conspicuous; it occurred, however, in the mid-forest also as members of the organised "drives" which one so often noticed. This species had finished breeding by April.

These birds do not exactly agree with Kilimanjaro specimens, but I have insufficient material of *mediocris* (only four males) from the mountain, and in cases where the differences in the races can be best seen in series, the females are also of great value, and they often exhibit better characters than the males. Thus 12 females from the Chyulu hills cannot possibly be united with 14 specimens from Kenya and the Aberdares; they are quite distinct.

While on the subject of *C. mediocris* I should like to draw attention to the races *moreaui* and *loveridgei* (as arranged by Sclater, *Ibis*, 1933, p. 215). I have no *moreaui* and cannot comment on this supposed link. I have, however, a cotype of *loveridgei* and it would appear at first sight to be most closely allied to if not definitely a race of *C. regius*, of which I have a series, except that the bill in *regius* is very small; very large in the latter, 14 mm. and 25 mm. *Loveridgei* and *regius* have the following in common: Above, they both have olive rumps; they both have strongly violet upper tail-coverts (not blue as in all

rates of *mediocris*); they have the edges of the greater coverts and wing feathers edged with the same olive-green (slightly redder tinged in *regius*); the distribution of the two colours of the lower surface are the same except that *loveridgei* is duller red and more olive-tinged on the sides.

Again *loveridgei* has an enormous bill, 25 mm. compared with *mediocris*, 17-18 mm.; *moreaui*, 20 mm. (measured in straight line). It seems best to retain them as species, *loveridgei* at least.

CINNYRIS VENUSTUS FALKENSTEINI.

Purple Yellow-bellied Sunbird.

This little Sunbird was occasionally seen on the range but in numbers not nearly approaching *mediocris*. It was invariably noted at lower levels amongst the *Erythrina-Cussonia-Vernonia* association and among the *Acacias*.

This race of *venustus* must meet *albiventris* somewhere on the line of the Tsavo. I have the latter from this locality (thus Friedmann's map, *Bull.* 153, U.S. Nat. Mus., p. 358, is incomplete), and although I previously had *falkensteini* from Kilimanjaro I hesitated in suggesting a possible line of contact. In the series of birds taken on Chyulu are three from the great lava flow between the two Chyulu ranges. They exhibit characters which are suggestive of *albiventris* influence. The lava flow is on the 4,000 foot level and merges on the bush country in which *albiventris* is found within 10 miles. They are very pale below and the yellow is streaky—not uniform.

CYANOMITRA OLIVACEA CHYULU. Subsp. Nov.

Chyulu Olive Sunbird.

Where this species occurred, it was in very considerable numbers. It is of interest to note that at the northern part of the range, where the mist-forests were restricted in size and less drenched with heavy banks of mist and dew, and thus considerably drier, the species did not occur, so far as we could ascertain during the month spent in this area. Had it been there we were bound to have noted it. Another factor which doubtless has some bearing on its distribution on the hills is that at this northern end, the two principal plants on which it fed, namely a species of *Leonotis*, was only very rarely represented, and the giant *lobelia*, which did not occur at all. It was not until we began to work the larger middle, and the Great Chyulu forest that it was met with, and at this latter place it was very common. When I first saw the birds a curious impression was conveyed to me: either the birds had salmon-red heads or white ones. Having shot one, the explanation was forthcoming: the colour of the head was due to the pollen of the two flowers on

which the birds fed, *Leonotis* giving the red, and *Lobelia* the white or yellowish.

At all times of the day, but particularly in the early mornings or toward late afternoon, dozens of these birds could be seen feeding on the two plants along the forest edges at 5,500 to 7,200 feet. Like many of the larger Sunbirds they are quarrelsome and drive each other off when intentionally or not two birds came too close to one another. The *Leonotis* and *Lobelias* in this place grow to an immense height, often 15-25 feet and more, and they were in bloom throughout the two months we were resident at the middle and south end. There was thus ample opportunity for observing these birds. They were by no means restricted to feeding on the two plants mentioned, for one often saw them as members of a "drive" through the forest canopy; under such circumstances, they were feeding entirely on insects and spiders. Examination of many stomachs showed the food to consist of the two just mentioned, and nectar. A few nests were located, and all were within the forest but usually high up on an exposed twig at the end of a branch overhanging an edge of a clear patch in the forest. One nest was suspended from the end of a giant fern frond. No eggs were seen, only nestlings, and these were probably of a second brood, for most of the young birds were on the wing (May). The nest conformed to those of the race *changamwensis* which I had previously taken at the coast.

It was my custom to take a stroll along one of the numerous cuttings I had made through the forest just about sunset, in order to observe various birds about to seek their roosting places. This species seemed to exhibit a preference for well-leaved saplings where complete protection could be obtained from the bitterly cold wind and dense mist which usually came over just after sunset. One favourite spot occupied nightly by a pair was in the top of a dense clump of tall *Piper*, the large leaves of which gave ample shelter. I might mention in passing that several species of birds which hunted in the canopy resorted to the mid and undergrowth for sleeping purposes, conspicuous amongst such were the *Zosterops*. There was always much commotion before they went to roost. The roosting place would be visited, flown away from, and revisited several times before they finally settled down.

TAXONOMIC NOTE.

In order to appreciate the position of these birds in relation to the other races present in Eastern Europe, I have arranged my series, some 200 specimens, in groups representing their distribution. I have also had before me the recently published

views of J. Vincent (*Ibis*, 1934, pp. 85-92). On reading his remarks regarding the hitherto unquestioned race *changamwensis*, Mearns, I am left with the doubt as to whether he had a series representative of this race; for whereas he mentions his comparative material in the case of other races, he here refers to the original description only and not to material. Under the circumstances I am not satisfied with the conclusions he has come to regarding the "sinking" of *changamwensis* under the race *olivacina* of Peters from Inhambane. When we turn to his remarks regarding Neumann's race *neglecta* of Kibwezi, we find he has adopted a rather dangerous procedure in assuming that birds from Usambara, his only comparative material, are identical with Kibwezi specimens. Those who know the type of country round Kibwezi and thus have an idea of the ecological factors of the region, are not a little surprised that Usambara birds, which, as Vincent tells us on the authority of Moreau, "are never seen out of the rain-forest," but see Moreau, *Ibis*, 1937, p. 333, should be accepted as typical of birds inhabiting *not* rain-forest, but forests composed largely of *Acacias*, *Figs*, *Commifera*, *Euphorbia*, and a few other species only along the water courses or lava flows, and at the most can only be termed closed forest of a specialised type. We can assume then that he had no topotypical material of *neglecta* for this critical analysis.

Through the kindness of Mr. Kinnear of the British Museum, I have now had the opportunity of examining material collected by Vincent, and identified by him as *olivacina*, Peters, from Mozambique Prov., P.E.A.

I am entirely satisfied that *olivacina* is more washed with greenish below, less greyish, than *changamwensis*, Mearns; furthermore, the head-mantle colour of *olivacina* is purer green, less tinged with olive.

I therefore support *changamwensis* as a good race, and thus disagree with Vincent, who sinks this into *olivacina*. Moreover, through the great kindness of Mr. Moreau, I have been able to examine a series of Olive Sunbirds from the Pugu Forest, west of Dar-es-Salaam (thus from a locality cutting in between *olivacina* and *changamwensis*) and from Mafia Island.*

Although these agree with *changamwensis* in the greyish, less green-wash of the underside, they differ in being darker green on head and mantle and the bills are shorter, more robust and straighter for the basal half, then turn down, whereas *changamwensis* has the curve starting at the forking of the lower mandible; thus more curved, and it is more slender.

* This race is being described by me in the *B.B.O.C.*

The Chyulu birds are not *neglecta* of which I have topotypical material as well as material from nearby similar areas. They are darker purer greyish-olive-green, not olive-green with a yellow tinge; the head is darker than the mantle; the blackish areas on the primaries and secondaries are blacker, less brown-tinged; the margins of these and the coverts are purer green; the tails differ in the same respects as the wings; the cheeks are darker green with very little flecking; the under-surface is clearer grey on the belly, with a yellowish wash centrally, and greenish on the flanks; chin and throat washed yellowish-green.

Type: Male, Chyulu Mts., 14/7/38, 7,000 feet. Coryndon Museum Expedition, 1938. Forty skins, 6,000-7,200 feet. A montane race, inhabiting the mist-evergreen forests of the Chyulu Mountains. Wing measurements: Males, 62-67 mm.; av. 65 mm. Females, 56-60 mm.; av. 57 mm.

ANTHREPTES COLLARIS nr. *TEITENSIS*. Yellow-breasted Green Sunbird.

This species was very scarce on the range. Why, it is difficult even to suggest. Two specimens only were obtained from the canopy of a large forest tree.

While dealing with Sunbirds, I should like to take this opportunity of directing attention to the probability that *Anthreptes yokanae*, Hartert, described from a very long series taken at Rabai, Kenya Coastal Forest, is allied to *GUNNINGIA REICHENOWI*, Gunning, described from Beira, *Jrl. S.A. Orn. Union*, 1909.

It will be remembered that Roberts proposed the new generic name for the bird originally described as *Anthreptes*.

PLOCEIDAE.

DINEMELLIA DINEMELLI. White-headed Buffalo-Weaver.

Only found in the drier parts of the range such as on the low lava flows at 4,000-5,000 feet. A few flocks were seen and a couple of specimens procured. They are very much darker, blacker on the back than any of a long series of 40 skins from elsewhere. We know, of course, that these birds are very liable to staining by soil, especially laterite earth which browns them readily, but these birds are very dark on the mantle and pure white below.

PLOCEUS REICHENOWI REICHENOWI.

Reichenow's Masked Black and Yellow Weaver.

This was a very common species all along the forest patches throughout the range. A large number of birds were in the sub-

adult plumage. Two young in nestling plumage were secured, 18/5/38; the remainder of the series are adult males and females.

These birds are almost as active as Warblers and other mainly insectivorous birds, in their search for insects, and one found on examination of stomachs, that fully sixty per cent. of the food taken consisted of insects and spiders, and numerous moth larvae. One noted the birds scanning the beard-moss and lianas for insects. The species was recorded from 4,000-7,000 feet.

PLOCEUS NIGRICOLLIS MELANOXANTHUS.

Black-mantled Weaver.

Very few of this species were noted, most of them at the forest edges. The stomachs contained mainly insects. The male has rather more chestnut wash over the breast than usual.

PLOCEUS OCULARIUS SUAHELICUS.

East African
Spectacled Weaver.

A common species found to be plentiful in the open bush and lesser forest patches from 4,000-6,000 feet. Here again, insects were very largely consumed as well as green shoots and small berries.

ANAPLECTES MELANOTIS.

Masked Red-headed Weaver.

A few of these birds were noted amongst the *Erythrina* trees on the range at 4,500 feet, but they were numerous on the plains below at 3,000 feet, not in flocks, but in pairs or singly. I have noted them as nesting in the Kilimanjaro area in January-February.

AMBLYOSPIZA ALBIFRONS UNICOLOR.

Coast Grosbeak
Swamp Weaver.

This species was seldom noted on the higher portions of the range but was plentiful in the old cultivations at the foot of the hills and nested in the valleys where "bamboo" grass up to 10 feet high covered the depressions. One found them at the water-drip in the afternoon about 4 o'clock in association with other weavers and finches.

EUPLECTES CAPENSIS XANTHOMELAS.

Yellow-rumped
Bishop Weaver.

Was noted in small companies on the lower slopes and lava flows and each evening at the water-drip. The highest level where these birds were seen was at 6,500 feet in a shallow valley where tall bamboo grass was plentiful. Several immature of the season just over were present in the flocks. All the males were in full plumage with the exception of one sub-adult which was moulting in the yellow rump feathers. Two females are in heavy moult.

QUELEA QUELEA INTERMEDIA. Masked Weaver Finch.

Very few were seen, and these had come up to drink at evening. Many were noted in the valley below and around the old plantations.

CRYPTOSPIZA SALVADORII CHYULUENSIS. Subsp. Nov.
Chyulu Crimson-wing Forest Finch.

This forest Finch is one of the most difficult birds to collect, yet it is comparatively common. When the first two specimens were taken, I at once observed that they were very much darker than any race I had hitherto examined, and a very close look-out was kept for further material. My previous experience has been that where one has obtained this species in a given spot, one can count on obtaining others. Two weeks elapsed before we located them again, and by noting carefully what these birds were feeding on (grass seeds obtainable only in forest or forest edges, mainly species of *Setaria*) we subsequently procured a very long series from places where we had noted these grasses growing in abundance, in more or less open places in the dense forest. One had to approach these spots slowly and carefully for these birds take fright easily and slip up into the mid-growth and one would never guess that they were in the vicinity. They were very much more numerous in the Great Chyulu forest than in any other part of the range. The only note one heard them utter was a low "chip-chip" as they flew off when disturbed. On no occasion did one see these birds fully exposed except when one had noted them slipping up into the mid-growth; they fed on the lower sprays of grass seed which had bent over amongst the leaves. I had noticed a similar behaviour with the Kenya highlands race wherever I have met with it. The species occasionally appear in the museum grounds where remnants of the old forest still survive. As soon as the birds are disturbed, they go up into the thick foliated mid-growth. Moreau (*Ibis*, 1933, p. 411) states that the species *Reichenowi sanguineolenta=ocularis* disappears "into the thickest ground-cover," and presumably stay there, for he adds "they do not appear to rise more than a dozen feet above the ground except when visiting their nests." No nests of the Chyulu birds were found, but that of *S. ruwenzori* is built of grass and tendrils, and formed into a ball slightly longer than broad with an opening towards the top and side, and situated hardly more than 6-12 feet up in saplings or sometimes in lianas. The nesting season must have been over by the first week of May, for we only observed young in first nestling plumage during May to July. They are paler, more buffy below and have much less crimson on the back and wings than adults; they are very like the race *borealis* of Mt. Urageess.

TAXONOMIC NOTE.

I have already alluded to the fact that the Chyulu birds are very much darker below than the race of the Kenya highlands and Uganda, all said to be *ruwenzori*. In addition they are very much darker on the head, more greenish; and the crimson areas are richer. The colour of the abdomen, crissum, and under tail-coverts is darker. They are thus nearest to the recently described *kilimensis*, Sclater and Moreau (*B.B.O.C.*, Vol. lv, p. 13), but they are even darker than that race, six examples of which have been examined by me. Type: Male, Chyulu, Camp 3, 6,800 feet, 30/6/38. Coryndon Museum Expedition, 1938. Paratypes 26 specimens.

LAGONOSTICTA RUBRICATA HILDEBRANDTI.

Black-vented Fire Finch.

These Fire Finches were noted in the lesser forests and on the forest edges where particular grasses were in seed. A female obtained on 8/5/38 was heavy in egg and was about to lay. This was one of the few birds which, at the beginning of our visit, was still nesting. A male obtained on 17/7/38 had enlarged but softening testes. Noted from 4,500 to 6,500 feet.

TAXONOMIC NOTE.

A very careful survey of these little finches will have to be carried out in order to arrive at a correct idea of their relationship. Not the least important point in working out distribution and species will be environment. There are at least four names devised for the larger Fire Finches of Kenya, including Kilimanjaro. A point which must be kept in mind is that there are two groups, one associated with forest land, the other with dry thornbush, thus it will be necessary to ascertain the exact type locality and have a knowledge of the ecological factors of that place. For example, we have the name *hildebrandti* applied to a bird taken in Ukamba, a district of several hundred square miles with varying altitude, climate, and vegetation. I have provisionally placed the Chyulu birds as this race: Moreau does the same for the Usambara birds. The two species, of which there are many within Kenya and Uganda, are *rubricata* and *jamesoni*.

COCCOPYGIA MELANOTIS KILIMENSIS.

Grey-headed
Grass Finch.

Several small companies, parents with young, were noted on the edges of the forest at 4,500 to 6,500 feet, feeding on grass seeds. One sometimes found them in the middle of a forest where there was an open space and grass. They were also noted in deserted "shambas."

ESTRILDA ASTRILD MINOR \cong MASSAICA.

Red-eyebrowed Grass Finch.

Several small flocks were noted at several portions of the range, but they were most numerous in the old cultivations on the eastern side. 4,000-6,500 feet.

ESTRILDA RHODOPYGA CENTRALIS.

Buff-breasted
Grass Finch.

This species was invariably found at lower levels than the previous one, that is, it did not range so high, and no birds were noted above the 4,500 line. It was, however, very numerous at 3,000 feet. My experience has been that this species is to be found most frequently in the open grass country where scattered clumps of bush occur around which certain grasses are associated. I have noted them to be very partial to the "sticky grass" which frequently overgrows deserted cultivations.

ESTRILDA CHARMOSYNA KIWANUKAE.

Black-faced
Grass Finch.

In the *Erythrina* associations where grasses had grown to a considerable height, owing to the shelter and protection afforded, several pairs of this finch were flushed on different occasions. They do not associate in flocks, and at the most one may see half a dozen birds together; parents with young. The nest of this bird is very similar to that of other *Estrilda*, but I have not noted the super-structure so frequently found in *E. estrild*. Placed very low in a bush surrounded by grass, these nests are much more hidden than those of other species. The eggs are pure white; usually four in number. The hen bird sits very close.

FRINGILLIDAE.

POLIOSPIZA ANGOLENSIS REICHENOWI.

Yellow-rumped Grey Serin.

This species was plentiful in the lower and intermediate zones of the hill where they were noted feeding on the seeds of certain composites, including *Bidens*. They were also noted to feed on the half-formed seeds of the wild Blue Lupin. Altitude range 3,000-5,000 feet.

SPINUS CITRINELLOIDES CHYULU. Subsp. Nov.

Chyulu Grey-faced Serin.

Hitherto the nearest relative of the Chyulu bird was recorded from Kilimanjaro and Usambara south to Nyasaland under the name *hypostictus*, Reichenow, type locality Moshi. I

found the species to be numerous on the Chyulu Range at altitudes of 4,000-7,000 feet and a long series was collected. At the lower limits of its distribution it was scarce, but at 5,000 feet, pairs and small companies were numerous, feeding on the seeds of a wild sunflower and other composites; it was only slightly less abundant at 6,500 all along the edges of the forest where these composites grew in profusion. Two nests were found in small *Erythrina* trees growing at the edge of a valley forest; almost fully fledged young were present, so this bird may be considered one of the late breeders on the range.

TAXONOMIC NOTE.

These birds were plentiful on the Chyulu Range at altitudes varying from 4,000-7,000 feet, and were most numerous at the 5,000 level. I have compared them with topotypical *hypostictus* of Kilimanjaro, and the following is a comparative description.

Allied to the race *hypostictus*, these Chyulu birds differ in the much richer yellow underparts, with hardly any paling off of the yellow on the abdomen and crissum; that whilst the breast is not so heavily streaked, the yellow of the throat goes further toward the chin; the grey of the chin and the fore-part of the face is darker, and more restricted. The ear-coverts are darker green. The green of the crown and mantle is purer, and the dark streaking is, on the whole, narrower. The rump and upper tail-coverts are more yellow.

With the exception of one male which is a partial albino, the series is uniform.

Type: Male, Chyulu Range, 24/4/38, 6,560 feet. Coryndon Museum Expedition, 1938.

Remarks: Nine males, eight adult females, and two sub-adults were collected. The wing measurements are as follows: Males, 65-70 mm.; females, 63-67 mm., thus very similar in size to the Kilimanjaro race.

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PART 3.

BUTTERFLIES OF THE CHYULU RANGE.

A systematic list of the species taken by the Museum Expedition to the Hills. April-July, 1938.

By

V. G. L. VAN SOMEREN, F.L.S., F.R.E.S., Etc.

INTRODUCTION.

The following account of the Lepidoptera (Rhopalocera) taken by members of the Museum Expedition to the Chyulu Range, is mainly a systematic list of the species obtained.

At the time of the visit, April to July, 1938 (that is just toward the end, and after the long rains) insect life was remarkably scarce, and although systematic search was made over all portions of the hills from 3,000 to 7,000 feet, at no time were butterflies numerous. The material taken can be considered representative of the range for that particular season, but there is little doubt that insect life would be more plentiful just after the short rains, as it undoubtedly is on the surrounding plains, especially in the Kibwezi-Voi areas.

In spite of the paucity of insect life, certain new records have been established, thus *Papilio hornimani* is recorded for the first time from within Kenya boundaries, although known for many years to inhabit the forests of Mt. Kilimanjaro. *Charaxes fulvescens* nr. *acuminatus*, also of Tanganyika, was taken on the range. Two new races of Liptenines of the genus *Pentila* are recorded, whilst a new *Acraea*, a new *Papilio*, and a new race of *Amauris* are described.

The Lepidoptera collected have a definite relationship to the vegetational zones and the distribution of certain plant species at various altitudes and portions of the hills.

In the systematic list which follows an indication is given of the altitude range of each species so far as we were able to judge during the comparatively short stay on the hills.

Family: PAPHIIONIDAE.

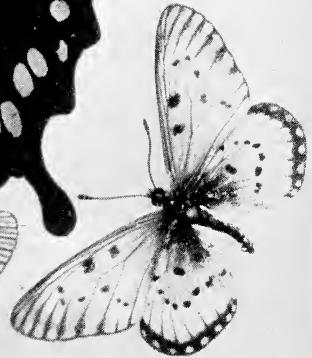
1. *PAPILIO DARDANUS TIBULLUS*, Kirby.

This species was not found on the northern or central portions of the range, but was comparatively common at the southern end along the forest margins. It was not seen in the actual forest but always at the edges where sunlight penetrated; the interior of

1

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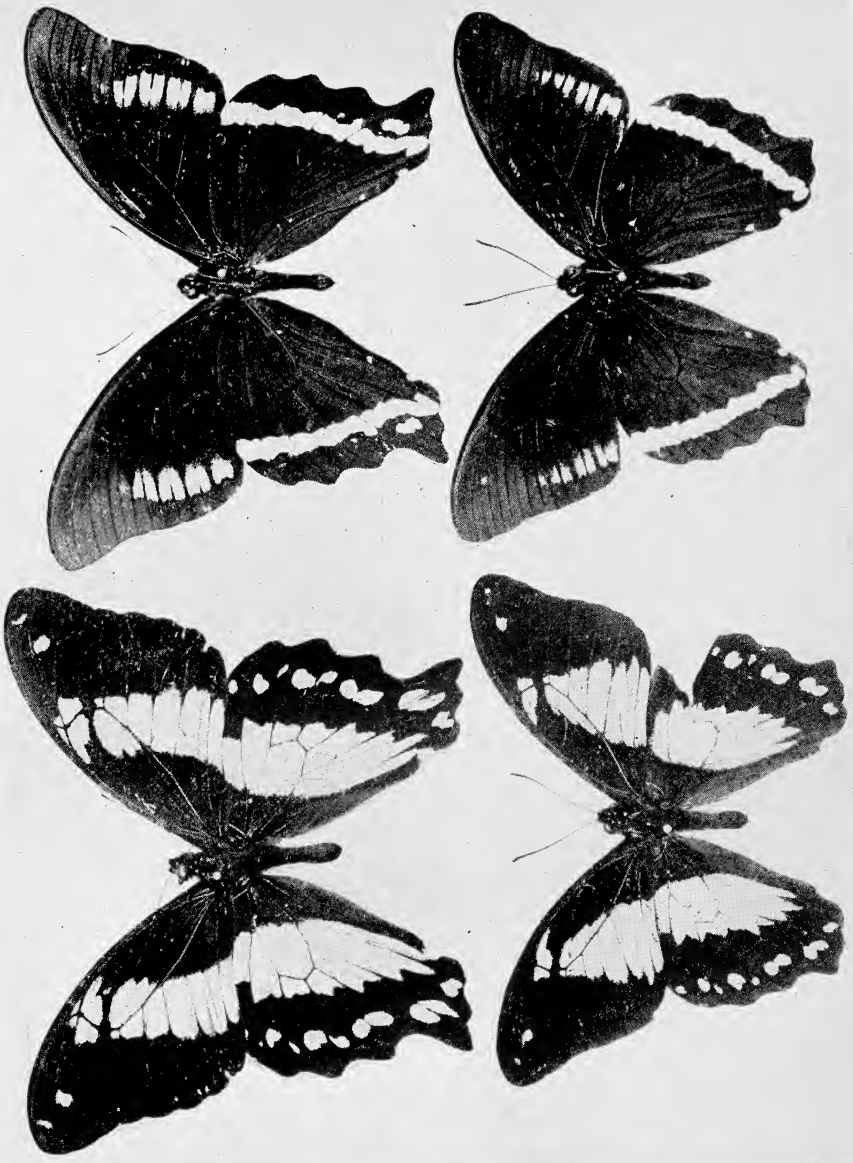
Figs. 1 and 2. *Pentila amenaída chyulu*. Subsp. nov.

Fig. 3. *Kedestes nerva*, Fab.

Fig. 4. *Papilio hornimani*. Dist.

Figs. 5—7. *Acraea anacreon chyulu*. Subsp. nov.

Figs. 8—9. *Pentila peucetia chyuluensis*. Subsp. nov.



3
Figs. 1 & 2. *Papilio brontes desmondi*. Subsp. nov.
4
Figs. 3 & 4. *Papilio brontes brontes*.



the Great Chyulu forest was too damp and dark for most species of diurnal lepidoptera. The food plant of the species was present in the lesser forests of the northern portions of the hills but there was no continuity between these forest patches and the lowland forests at 3,000-4,000 feet, whereas at the southern end there was a gradual merging of the low mixed forest with that of the mountain forest through ravine and valley forests in at least one point. The species was abundant in the low mixed forests on the lava flows between Noka and the main range. The twenty-odd males collected are remarkably uniform; all have a continuous heavy black band on the hind wing. Three forms of female were taken: *hippocoon*, a variation of *cenea* and an intermediate between the vars. *salaami* and *mixta* with the sub-apical f.-w. bar confluent with the light orange spot in the apex of the cell. The first two forms were numerous as were the respective models, *Amauris niavius dominicanus*, and *Amauris (albimaculata) hanningtoni*. The altitudinal range of the species was 3,000-7,000 feet. The *hippocoon* form of female predominated in the low forests, whereas the *cenea* form was more plentiful on high ground, the two forms being in definite ratio to the abundance of their respective models. The species was bred from larva obtained on the hills.

2. *PAPILIO ECHEROIDES*, Trim.

A common species throughout the range, on the whole more numerous at the north and central portions. Males outnumbered the females on the edges of the forests, but just within the marginal growth, especially at the north end, females were common. On the wing they bear a strong resemblance to their models, *Amauris hanningtoni* and *A. echeria* nr. *jacksoni*. This species was also bred on the hills from eggs and found larvae. They were raised on *Teclea*. Altitude 4,000-7,000 feet.

3. *PAPILIO CONSTANTINUS*, Ward.

Although extremely plentiful in the plains country, only one specimen was taken on the range at 4,500 feet.

4. *PAPILIO PHORCAS* nr. *ansorgei*.

Very few examples of this species were noted, and all were in very worn condition. Two males were taken at 6,000 feet. The species is very plentiful in the plains country around Kibwezi.

5. *PAPILIO HORNIMANI*, Dist.

Hitherto recorded only from Tanganyika, we found this species to be quite common at the northern end of the range. It did *not* occur in the southern portion. The reason for this break

in its distribution is difficult to understand. There was, however, a definite association between this species and *P. brontes*. There is a distinct resemblance on the wing and on the ground, when the wings are closed; and indeed their distribution tallied, for the latter was distinctly rare in the southern part of the range. The 14 males taken are very uniform; the only variation is in the number of blue spots at the apex of the fore-wing, being either one, two, or three. Two females were captured and confined in cages to obtain eggs; the larvae subsequently obtained were not reared owing to lack of food after leaving the hills.

6. *PAPILIO BRONTES DESMONDI*. Subsp. Nov.

As indicated under the previous species, these butterflies were very numerous at the first camp toward the northern portion of the range. They were certainly the common *Papilio* of the area. The forests at this portion of the hills were not very thick and more or less clear of heavy undergrowth in most instances. Thus one found this species inside the forests, but to a far greater extent on the outer margins where indeed most of the flowering herbs, on which they fed, for example *Pentas*, occurred. Apart from forest one noted the species in numbers at the "water drip" drinking at the moist earth below the water troughs. We attracted this species and *P. hornimani* to the door of our tents by keeping a small area wet with waste water; we were thus able to secure a long series with little effort. The series is very uniform, all but two of the males exhibit a considerable expansion of the blue band in 1a and 1b. The females have narrower fore-wing bars.

DESCRIPTION:

This race of *Papilio brontes* is in general shape very similar to *P. bromius chrapkowskii*, i.e. it has the same elongation of the posterior angle of the hind-wing; it, however, is to be distinguished at a glance from this species by the shape and colour of median band above, and the size and shape of the submarginal creamy spots on the underside of the fore-wing. From the nominate race of *brontes* of Kilimanjaro area, with an extension to the Teita Hills (Mbololo, Wandanyi, and Bura) this new race differs in the shape of the median blue band, which in the fore-wing is less triangular in outline; slightly concave on its inner side, for the blue does not reach the base of area 2, and on its outer side it is more strongly dentate, but not so inclined toward the hind angle: thus narrower than in *brontes brontes*. In the hind-wing the median band is almost parallel sided in its middle section, maintaining an almost straight line on its outer aspect, it tapers rapidly toward a white spot, marginal in 1b.

The fore-wing margin is more falcate, whilst the hind-wing is more strongly dentate, the end of vein 4 being extended to form a truncated "tail." The sub-marginal row of blue spots in the hind-wing are larger and in the fore-wing there are small double blue spots in areas 1a-5.

On the under surface, the fore and hind-wing submarginal bands differ considerably as can be seen from the illustrations.

The female differs from the male in that the fore-wing median band is narrower. Type, male, Chyulu Range, 6,800 feet, April, 1938. Coryndon Museum Expedition, 1938. Taken by Desmond van Someren. Alt. range, 5,000-7,200 feet. Described from a series of fifty specimens.

General remarks: Examples of this race together with nomino-typical *brontes* were submitted to Dr. Karl Jordan, who writes as follows: "Papilios from Chyulu. . . . The general aspect is very misleading. It is a subspecies of *P. brontes*, differing markedly from *P. brontes brontes* in the shape of the median band and in the shape of the hind-wing. The harpe of the clasper has the characteristic shape of the harpe of *P. brontes*, elongate-oblong, flat, with two narrow sharply pointed, widely separated, curved, apical horns; in the Chyulu males the harpe is narrower than in *brontes* from Wandanyi and Kilimanjaro. . . . The Chyulu subspecies is interesting, as it bears a superficial resemblance to *P. bromius chrapkowski*. I think *P. brontes* is a species distinct from *P. bromius*."

In describing the Chyulu race I have accepted the suggestion that *P. brontes* is a species.

It is a matter of considerable interest to note that *P. brontes desmondi* was extremely plentiful on the Chyulu range from a level of 5,000 feet and up to 7,200 feet. It was associated with *Papilio hornimani* and was indeed difficult to distinguish from that species except by its smaller size, and absence of long tails, which could only be noted on close examination.

7. *PAPILIO NIREUS LYAEUS*, Dbl.

This species was *not* found on the range. Only one example was obtained at the south end at 4,500 feet. It was one of the commonest species on the plains especially at Kibwezi.

8. *PAPILIO DEMODOCUS*, Esp.

Was only seen on the lower larva flows at 4,000 feet and did *not* occur on the hills proper.

No other Papilios were noted on the hills, but several species were common on the plains.

PIERIDAE.

9. *LEPTOSIA ALCESTA*, Cr.

Abundant in the more open forests of the northern end and occasionally noticed in the Great Chyulu Forest of the south. Eggs and larva were noted on species of *Capparis*. 4,000-5,600 feet.

10. *HERPAENIA ERIPHIA*, Godt.

A common species along the margins of the northern forests and on the great lava flow between the main range and the South Chyulus. It was very much more numerous on the plains.

11. *MYLOTHORIS AGATHINA*, Cr.

Was noted as plentiful in the northern and central portions of the range between 4,500 and 6,000 feet, frequenting the lesser forests and the edges of the larger patches, particularly in the vicinity of trees which carried quantities of *Loranthus* on which both eggs and larvae were found. Two species of *Loranthus*, *dregei*, and *woodfordioides* were the chief food plants, on the range, while on the plains *panganensis*, parasitic on *Sterculea* sp. was infected.

The sexes were noted in about equal proportions, whilst the orange females outnumbered the form approaching the male colouration.

12. *MYLOTHRIS RUEPELLI*, Koch.

This species was very common, more particularly in the central and southern portions of the hills. The larvae fed on *Loranthus woodfordioides*, 5,000-7,000 feet.

13. *MYLOTHRIS SAGALA*.

A common species, noted throughout the range from 5,000-7,000 feet. The series taken during April to July are uniform in that there are no marginal black spots to the hind-wing in either sex. I have not designated the actual race or form as there is still considerable uncertainty as to grouping of this species. The series taken do not agree with material from the Teita Hills nor yet with a long series from near Nairobi.

14. *GLUTOPHRISSA EPAPHIA*, Cr.

This species was seen all along the range. Males predominated. The females taken are of the wet-season form. As there were no *Phrissura* present on the hills one is justified in assuming that all the males of this group one noted, were of this species. In localities where *Ph. udei* occurs along with *G. epaphia* males are impossible to distinguish on the wing.

15. *PIERIS MARGARITACEA*.

Examples of this species, which would appear to be a distinct species from *raffrayi* (for both occur together over a wide range, without interbreeding) were noted on the southern portion of the range at between 6,000-7,000 feet. Chyulu examples belong to the Teita race which is distinct from either the typical race from Mau and Sotik, or the Meru race *somereni*, which has a very rich orange on the underside. Only males were secured, though a few females were noted. It was not common.

16. *BELENOIS SEVERINA*, Cr.

17. *BELENOIS MESENTINA*, Cr.

18. *BELENOIS ZOCHALIA*, Bdv.

These three species were well represented on the hills and were mostly found along the forest margins where flowering herbs were most plentiful. Of the three species *zochalia* was by far the commonest. Three forms of females of this last were taken in about equal numbers. 4,000-6,800 feet.

19. *BELENOIS THYSA*, Hpf.

This was a common species at the southern portion of the range more particularly at the 6,000 feet level, though it also occurred at lower levels. Its distribution was largely governed by the distribution of food plants which existed along the forest edges and not on the grass lands. One noted the species flying over the moorlands but there was a definite concentration along the high forest margins. Two types of female were taken; the orange-buff variety being numerous and in association with the female of *Mylothris agathina* of more or less the same colour.

20. *TERACOLUS CELIMENE*, Luc.

Very few of this species were noted on the hills, but it was plentiful in the low country.

21. *TERACOLUS HETAERA*, Gerst.

Occasionally seen on the lower levels at 5,000 feet; most of the specimens taken were from the Noka road at 3,000 feet. Males and females are of the dry season form.

22. *TERACOLUS ERIS*, Klug.

Not seen on the range proper but numerous on the great lava flow at the south end.

23. *TERACOLUS ACHINE*, Cr.

24. *T. OMPHALE*, Godt.

25. *T. ANTIGONE*, Bdv.

26. *T. DAIRA*, Klug.

Examples of these *Teracoli* were taken sparingly on the hills in the moorlands, but the country was definitely unsuited to this group, doubtless owing to the damp and cold, and lack of the food plant. They were, of course, very numerous all through the thorn bush of the plains at 3,000-4,000 feet.

27. *TERACOLUS INCRETUS*, Btl.

Numerous on the plains. Very few seen on the lower hill lands at 5,000 feet.

28. *ERONIA THALASSINA*, Bdv.

Though noted at various places along the range, this species was by no means common. It was not seen above 6,000 feet, but was numerous on the lower ground of the plains.

29. *CATOPSILIA FLORELLA*, F.

Only once seen on the main range at 5,600 feet, but very plentiful on the lower levels at 3,000-4,000 feet.

30. *TERIAS SENEGALENSIS*, Bdv.

This species was widely distributed along the hills but nowhere numerous. 5,000-6,000 feet.

31. *TERIAS BRIGITTA*, Cr.

Fairly plentiful, more so toward the southern portion of the range. The form *zoe* was not numerous.

32. *TERIAS REGULARIS*, Btlr.

Was only met with in the low country around the lava flows at 4,000 feet.

33. *TERIAS* nr. *MARSHALLI*.

This form was very numerous all along the hills from 4,000 feet to 6,500 feet. The collection contains a long series, which is very uniform in both sexes, taken from April to July.

34. *COLIAS ELECTO*, L.

Was plentiful in the high ground up to 7,000 feet, but most numerous at about 6,000 feet. Both the pale and the dark forms of females were taken in about equal numbers.

DANAIDIDAE.

35. *DANAIDA CHRYSIPPUS*, L.

The species was common throughout the grass lands of the range and along the clumps of bush where various species of Asclepiads were growing. It is of interest to note that of the long series taken, all, with the exception of one, are of the form *DORIPPUS*, Klug. The exception is the form *albinus*. The typical form was noted as plentiful on the lower ground at 3,000-4,000 feet.

36. *MELINDA FORMOSA*, Godm.

Several examples of this species were noted at the southern forests; it was absent from the northern portions.

37. *AMAURIS NIAVIUS DOMINICANUS*, Trim.

A common species most plentiful in the lower mixed forests, but extending up the hills to the 6,000 foot level. The mimetic female form of *Dardanus*, *hippocoon*, was often seen in association with this insect.

38. *AMAURIS (albimaculata) HANNINGTONI*, Btlr.

A very long series was taken. They are very constant in type. This species was frequently noted passing over the open moorlands some distance from forests. Larva and eggs were taken on creeping Asclepiad in the forest. It was certainly the commonest *Amauris* of the range and acted as model for *P. dardanus*, f. *cenea* and the females of *P. echeroides*. Females were as numerous as males and the species was about equally distributed along the range.

38a. *AMAURIS ECHERIA CHYULUENSIS*. Subsp. Nov.

The form of this species found on the range differs from the nomino-typical *jacksoni* from Kericho-Sotik area in having a much paler hind-wing patch with a greater extension of this pale ochreous area towards the hind angle; the sub-marginal spotting is paler: there is an even more marked difference between the females of this race and typical *jacksoni*. Besides the much paler-cream- hind-wing patch, the sub-marginal and marginal spots are more numerous and larger and white. A long series of over 30 was taken. Type: Male, Chyulu Hills, April, 1938. Coryndon Museum Expedition.

There is a close resemblance between this insect and the pale race of *A. albimaculata*, *hanningtoni*; in fact they cannot be told apart when on the wing. They may be distinguished in the

hand in that *A. a. hanningtoni* has a pale lower surface to the abdomen, and of course, the "brand" is of a different shape.

DISTRIBUTION: This pale race of *echeria* ranges over the Chyulu and Teita Hills.

ACRAEIDAE.

39. *PLANEMA AGANICE MONTANA*, Btlr.

Was noted and obtained along the edges of the Great Chyulu Forests. The females were noted in association with the black and white form of *Acraea esebria*.

40. *ACRAEA ESEBRIA*, Hew.

Noted only in the southern parts of the range. Three forms of females are in the series taken: *esebria*, *monteironis*, and *jacksoni*. The females were taken laying on a creeper *Urerea* sp. (*Urticaceae*).

41. *ACRAEA JOHNSTONI*, Godm.

Was occasionally seen on the edges of the southern forests, at 6,000 feet.

42. *ACRAEA CABIRA*, Hpff.

This was the commonest of the smaller species of *Acraea* and occurred all along the forest margins throughout the range. It is worthy of note that on this range, the form is entirely different to that on the Teita hills a little to the south.

43. *ACRAEA ACERATA*, Hew.

This was a scarce species and very few were noted and always at the northern and central portion of the hills.

44. *ACRAEA TERPSICHORE*, L.

Although found on the hills, this species was far more numerous on the lower ground at 3,500 feet. A long series was bred from larvae found on *Triumfetta* sp. It is noteworthy that the female form produced was scarce on the hills.

45. *ACRAEA NATALICA*, Bdv.

A common species, particularly plentiful on the lower ground but extending on to the hills up to 6,000 feet. The larvae were found feeding on a species of creeping *Adenia*. Five forms of females are included in the long series taken.

46. *ACRAEA CAECILIA*, F.
A few specimens were noted at the 4,000 level but below this it was very common.
47. *ACRAEA BRAESIA*, Godm.
Plentiful at 3,000 feet, but seldom noted on the hills at the 5,000 level.
48. *ACRAEA AEQUATORIALIS ANAEMIA*, Eltr.
This was a common species in the northern and central portions of the range all over the grass lands. It was noted to lay on a small species of Passiflor (*Adenia* sp.) which grew in abundance in the grass, and from this plant several mature larvae were secured. The pupae were found hanging on adjacent grass stems. It is to be noted that the nominate race also feeds on an allied though distinct species of Passiflor. There is a very considerable variation in the female forms.
49. *ACRAEA ACRITA*, Hew., *pudorina*, Stgr.
Throughout the grasslands of both the hills and the low country—6,000-3,000 feet—this species was plentiful. Males are of two types, a dry form in which the marginal loops are obscure and the other in which these are clear and well defined. Six of the females are of the very dark blackish type.
50. *ACRAEA EGINA ARECA*, Mab.
Rather scarce on the range, but plentiful at below 4,000 feet.
51. *ACRAEA ZETES ACARA*, Hew.
The 5,600 feet level appeared to be the upper limit of this species, where a few were noted and obtained. At 3,000 and 4,000 feet it was more plentiful.
52. *ACRAEA ANEMOSA*, Hew.
Was only taken at the base of the hills at 4,000 feet.
53. *ACRAEA BAXTERI*, E. Sharpe.
This was entirely a montane species and kept to the borders of forest at 5,500 to 6,500 feet. It was frequently seen feeding on the flower heads of certain tree *Umbelliferae* quite out of reach and when disturbed would sail over the tops of the forest trees. A small series was obtained and these should be referred to the form *subsquamia*, Thur. When seen from below, with the sunlight overhead, the red of the wings shows up as orange. They then bear a strong resemblance to a diurnal moth which was plentiful throughout the range. This moth is highly distasteful

and it would seem that the butterflies derive added protection from their resemblance to it.

54. *ACRAEA NEOBULE*, Dbl. and Hew.

Present on the range but in small numbers; plentiful on the lower slopes and on the plains.

55. *ACRAEA ANACREON CHYULU*, Sbsp. Nov.

A series of this interesting insect was taken along the forest margins at the central and southern portions of the range on the eastern side at altitudes of 5,500-7,000 feet. They bear a superficial resemblance to *A. rahira* and *A. anacreon anacreontica* but differ from both in many respects.

Examples of these insects were submitted to Prof. Carpenter, and Capt. Riley of the British Museum. The latter writes as follows: "Although there is nothing in our series (of *anacreon*) quite like your two specimens, I feel sure that they are a race of that species. . . . If this pair represents a constant race, then I should think that van Someren would be quite justified in describing it." As the nineteen examples show a remarkable degree of constancy, I have no hesitation in describing them as a new race.

Type: Male, Chyulu hills, 6,500 feet, June, 1938.

Male, upperside: length of f.w., 22 mm., tawny-ochreous with a suffusion of pink, particularly in basal half. Compared with the race *anacreon anacreontica* of the Mara River, Sotik, Lumbwa, Kavirondo, and Elgon areas, there is a marked reduction in the number of f.w. spots which are arranged as follows: one in cell, just beyond mid-point; a larger one at apex of cell at roots of veins 5-6; a double spot sub-distal in cellule 1b, with a spot directly above it in 2, just distad to origin of vein 3, with another small one sub-basal in 3. Veins 1-7 blackish scaled distally toward the margin, shorter and thicker from 1-3, longer and narrower from 4-7; between the rays a slight increase in the orange colour. It lacks the submarginal black bar which joins up the rays in the race *anacreontica*. Costa, toward distal end black scaled. There is a small area of blackish scales at the extreme base of the wing.

H.-w.: Ground colour as in f.-w., but basal area with a greater amount of black scaling, greater than in the race *anacreontica*. The spotting also differs in that the post-discalars are in almost a straight line from the inner margin at 1c-4 then curving up to about the mid-point, sub-costal in 7. There is one large black spot in the cell. The marginal border is black, less than 2 mm. wide and carries orange internervular spots. It will be noted then that in this race there is no angling of the post-discal spots at 2, toward the end of the cell as in *anacreontica*.

There is only this slight variation in the males: some few have an extra small spot in 6, sub-basally.

UNDERSURFACE: F.-w., ground colour pinkish-ochreous at basal half, shading to tawny ochreous distally; distal portions of veins narrowly black scaled and forming rays; black spot at apex and mid-cell, other spots of above only faintly indicated.

H.-w., ground colour ochreous with pink suffusion over basal area. Black spots as above but more distinct with an additional large spot sub-basal, and a series of three contiguous in 1a-1c sub-basal. The two rows of spots are joined up by pink longitudinal marks. Marginal border consisting of contiguous loops enclosing ochreous spots.

FEMALE, UPPERSIDE: F.-w. rather thinly scaled buffy, with pink tinge in basal half, but basal area blackish scaled. Blackish spots as in the male but with extra spots sub-basal in 4 and 5. The margin of the wing orange tinged internervularly. H.-w., ground colour as fore-wing, the black spots as in the male, with rather more black scaling at the base.

Underside: Ground colour buffy ochreous; blackish spots as in the male; pink quadrate bars between the two rows of spots very strong and showing through on the upper surface.

The genital armature has been examined by Prof. Carpenter, who states that it agrees with *anacreon* in general form.

56. *PARDOPSIS PUNCTATISSIMA*, Bdv.

Only one specimen was taken on the hills although it was comparatively common on the lower lava flows in the plains country, especially in the dongas between the lava outcrops where vegetation was rank and the conditions humid. It was taken in association with *Pentila amena*.

SATYRIDAE.

57. *HENOTESIA PERSPICUA*, Trim.

A few were noted in the grass lands bordering the forests and in dongas.

58. *NEOCOENYRA GREGORII*, Btlr.

This was the commonest of the small "Ringlets" and was everywhere plentiful along the edges of the forest lands.

59. *YPETHIMA ASTEROPE*, Klug.

Plentiful in the grass lands, but owing to the continuous winds, all the specimens seen were very worn and battered.

60. *MYCALESIS SAFITZA*, Hew.

A few were noted in the more open forests of the hills, but it was most abundant in the mixed forests on the laval ridges of the plains.

NYMPHALIDAE.

61. *CHARAXES HANSALI BARANGANA*, Rothsch.

One seen on the great lava flow at the south end, but fairly numerous just before the Ithaba Swamp on the Kibwezi-Chyulu trail.

62. *CHARAXES PELIAS SATURNUS*, Btlr.

Common on the plains and very few noted on the lower lava flows at 4,000 feet.

63. *CHARAXES ACHEMENES*, Fldr.

On the Noka-Chyulu trail this species was common but extremely difficult to obtain as they either rested very high up or amongst thorns, making it impossible to secure them. A male and female, the latter bearing a very strong resemblance to *saturnus*, were secured by climbing the tree on which they were resting. A few were noted on the great lava flow on the Italweni path, 4,000 feet.

64. *CHARAXES CITHAERON*, Fldr.

This was the only species of this group seen on the hills at 6,000 feet. As no specimens were secured, it is impossible to state whether or not there was any transition to the coastal race *kennethi*.

65. *CHARAXES ETHEOCLES PICTA*, Rothsch.

A few of this species were noted on the *Albizias* of the lower plains. A larva was taken on *Acacia mellifera* and eggs on *Entada* sp. The females taken are of the *kiriki* form.

66. *CHARAXES ETHALION*, Bdv.

Plentiful on the plains at 3,000-4,000 feet but were only noted on the hills at the Italweni lava flow, and at 4,500 feet. No females were taken.

67. *CHARAXES JAHLUSA*, Trim.

Only females of this species were seen at 4,000 feet in the abandoned banana shambas. They were feeding on decaying bananas still on the trees. One pupa was located on a sapling, obviously not its food plant, and from this a female emerged.

68. *CHARAXES CANDIOPE*, Godt.

This was one of the few species to occur actually on the mountains at 6,000 feet. They here laid on a sp. of *Croton*, which grew in profusion on the tops of certain of the forest hills, and along the forest edges.

69. *CHARAXES FULVESCENS* nr. *ACUMINATUS*, Thurau.

Several of this species were seen from time to time on the edges of the Great Chyulu forest at the southern end. They were extremely difficult to secure as they flew high and would not be attracted to bait. The only specimen obtained was taken at oozing sap on a tree at about 15 feet. It is noticeable that in this example the whole of the wing border, fore and hind, are very much darker than the race which inhabits the Kikuyu forests; this is especially the case in the hind-wing, so that the black spotting is almost obscured. The orange spotting on the fore-wing is smaller, whilst the falcate apex of the wing is of a different shape. There are other minor differences which need not be gone into here; suffice it to say that the Uplands race would appear to be a good one. The characters of the Kenya Highland race have been detailed in my paper in the *Journal of the Society, Butterflies of Kenya and Uganda*, part 7. More material of *acuminatus* must be taken before a name can be applied. Larvae of *acuminatus* were found on a species of *Allophylus*, and two full-grown were recovered from the stomach of a Trogon, *Apaloderma narina*.

70. *CHARAXES ZOOLINA*, and

71. *NEANTHES*.

A few of this species were noted on the lower lava flows, but it was absent about 4,000 feet owing to absence of the food plant.

NYMPHALIDAE.

72. *NEPTIS SACLAVA MARPESSA*, Hpffr.

Sparsely distributed in the drier forests of the northern portion of the range.

73. *NEPTIS AGATHA*, Stoll.

This was the common *Neptis* all along the range and was found near the *Erythrina* patches of the lower slopes as well as on the edges of the forests.

74. *NEPTIS SEELDRAYERSI*, Auriv.

A few examples of this species were taken at the southern forests, but it was distinctly scarce.

75. *BYBLIA ILITHYIA*, Drury.
A common species in the tall grass along the forest edges, particularly in the northern areas.
76. *BYBLIA ACHELOIA*, Wall.
A few were noted at 5,600 feet at the southern end of the hills.
77. *EURYTELA HIARBAS LITA*, Rothsch.
Plentiful in the southern portions of the range and less so in the middle section. Eggs and larvae were found on the stinging Euphorbiaceous "nettle," just within the forest edges.
78. *EURYTELA DRYOPE*, Cr.
Comparatively scarce: very few were noted at 6,000 feet on the south end.
79. *HYPOLIMNAS DUBIA MIMA*, Trim.
80. *f. WAHLBERGI*, Wall.
Both males and females of these two forms were in about equal numbers, more particularly in the southern forest edges, but they were nowhere common.
81. *SALAMIS PARHASSUS AETHIOPS*, Pal.
Although met with on the range at altitudes of 5,000-6,500 feet, this species was more abundant in the low mixed forests on the lava ridges at 3,500-4,000 feet.
82. *SALAMIS ANACARDII NEBULOSA*, Trim.
Only slightly less numerous than the preceding species and with a similar distribution, but very often noted in the drier portions and amongst the Acacia associations of the plains.
83. *CATACROPTERA CLOANTHE*, Cr.
Not very numerous, but occasionally noted in the grass lands all along the main range, at 5,000-6,000 feet.
84. *PRECIS LIMNORIA TAVETA*, Rog.
A few were taken along the forest edges at 5-6,000 feet and mostly in grass.
85. *PRECIS NATALICA*, Fldr.
Very few were noted on the range, but the species was plentiful in the low ground at 3,000-4,000 feet.
86. *PRECIS OCTAVIA SESAMUS*, Trim.

87. *f. NATALENSIS*, Stgr.

Both wet and dry season forms were sparingly distributed along the range; they were nowhere common although on the low ground at 3,000-4,000 feet they were numerous especially in the shaded dongas between the lava ridges.

88. *PRECIS TUGELA*, Trim.

89. *f. AURORINA*.

Occurred in both the wet and dry forms, but not common on the range.

90. *PRECIS ANTILOPE*, Feisth.

Was only noted on the lower ground at 4,500 and below.

91. *PYRAMEIS CARDUI*, L.

Common all along the hill sides and most conspicuous in the late afternoon, especially after a shower of rain.

92. *ATANARTIA HIPPOMENE*, Hbn.

93. *A. SCHAENEIA*, Trim.

Both species were present throughout the range at 5,000-6,500 feet and were taken along the forest edges.

94. *HAMANUMIDA DAEDALUS*, F.

Common all along the plains toward the foothills of the range, but not seen above 4,000 feet.

LYCAENIDAE.

95. *PENTILA AMENAIIDA CHYULU*. Subsp. Nov.

In the warm humid dongas between the laval ridges toward the base of the range, at altitudes of 3,500-4,000 feet this species was extremely plentiful during the month of April and May. One noted them in dense numbers clustering around the flower heads of a Leguminous plant (*Crotalaria* sp.?) at the glands of which ants and Aphids were feeding; on others ants and Coccids. One was able to capture fifty or more with one sweep. Associated with this species was *Pentila peucetia*, Sbsp. By the end of June, very few specimens were noted, and by July 20th not a single individual was noted, although hunted for.

As already noted under *Pardopsis punctitissima* (Acraea), the two species, bearing a very close resemblance, were associated in these dongas.

DESCRIPTION: The Chyulu race differs from the coastal *mombasae* in having a much wider and darker black border, and being more strongly and more numerous black spotted in both fore and hind-wings.

RANGE: The Chyulu foothills. Although there is some variation in the coastal race, none are as dark as the Chyulu race which, in a long series of over fifty, shows a marked uniformity of colouration.

96. *PENTILA PEUCETIA CHYULUENSIS*. Subsp. Nov.

This species was common and in association with the previous one, on the flowering spikes of the *Crotalaria*. Where one found up to fifty or so *amenaida* there would be four to six of *peucetia* amongst them. When a sufficient series of the former had been collected, the capture of *peucetia* was done with tweezers or fingers without disturbing the rest of the insects. I failed to note any insect which could act as a model for this species and am inclined to think that it is in itself distasteful, for a yellow secretion from the body has a disagreeable odour.

DESCRIPTION:

These specimens, of which a series of some 30 were taken, differ from the coastal race in that the dark areas are blacker, and the hind-wing has three distinct black spots on the lower side and two above with the third showing through distinctly. Although in a long series from the coast two out of twenty show traces of a third spot toward the costa on the hind-wing, these are not nearly as large or defined as in the Chyulu material. The spot on the underside toward the fold of the hind-wing is large; conversely only two of the Chyulu series have this spot faintly indicated.

97. *TERIOMIMA ASLAUGA*.

A few of this species were noted in the humid mixed forests on the lower levels at 4,000 feet. They did not occur on the range.

98. *HYPOLYCAENA PHILIPPUS*, F.

Was very numerous on the lower levels at 3,500-5,000 feet, but comparatively scarce above that level.

99. *DEUDORIX ANTALUS*, Hpffr.

Plentiful throughout the acacia and bush country but scarce on the hills. Larvae were located in seed pods of two species of legumes.

100. *EPAMERA SIDUS*, Trim.
Was occasionally noted on the range, and larvae were taken on *Loranthus woodfordioides*.
101. *AXIOCERSES HARPAX*, F.
Fairly numerous in the grass lands from 4,000-6,500 feet. In the early mornings these insects could be taken with the fingers as they rested benumbed with the cold. They were seldom on the move until near 11 a.m.
102. *LYCAENESTHES LARYDAS KERSTENI*, Gerst.
A few were seen and secured, but this group as a whole was badly represented on the hills.
103. *LYCAENESTHES OTACILLIA*, Trim.
Found feeding on the flowers of *Acacias* of the lower levels, but otherwise not seen on the range. 5,000 feet.
104. *CASTALIUS GREGORII*.
Only one example was seen and taken at 5,000 feet in the grass lands.
105. *URANOTHAUMA CORDATUS*, E. Shp.
A few of this species were taken at damp earth at the edge of the forest at 5,500-6,500 feet.
106. *URANOTHAUMA FALKENSTEINI*, Dew.
Fairly common at the higher altitudes 5,600-6,500 feet.
107. *CACYREUS LINGEUS*, Cr.
Common along the forest edges and adjacent grass lands.
108. *CACYREUS PALEMON*, Cr.
Fairly common in the bush and scrub surrounding the forest patches. The undersides are rather darker than Nairobi material.
109. *CUPIDO TELICANUS*, Lang.
Very common in the grass lands bordering the forest and at the "water drip."
110. *CUPIDO MALATHANA*, Boisd.
On the grassy slopes of the northern and central portions of the range this species was fairly numerous.
111. *CUPIDO CISSUS*, Godt.
Was undoubtedly the dominant species of the moorlands and grassy slopes throughout the range. The season for this species seemed at its height about June.

112. *CUPIDO IOBATES*, Hopff.

Only slightly less numerous than the preceding species and found in similar surroundings.

113. *CUPIDO MALATHANA*, Boisd.

Common in grass country.

114. *CUPIDO MAHALLAKOAENA*, Wallengr.

Of the small species this was by far the commonest and occurred all along the range in the exposed grassy slopes.

115. *CUPIDO KIDONGA*, Gr.-Sm.

Very few were noted and taken although on occasions we searched the grass lands exclusively for Lycaenids (species of *Acacia*). Its distribution was undoubtedly governed by its food, which did not extend high on the range.

116. *CUPIDO CRAWSHAYINUS*, Auriv.

A common species at altitudes of 4,500-6,000 feet.

117. *CUPIDO TROCHYLUS*, Freyer.

A few were taken in the grass country, but it was not common.

118. *CUPIDO LOUISAE*.

Only one specimen was taken at 6,000 feet in grass lands.

119. *CUPIDO GAIKA*, Trim. *LYSIMON*, Hbn.

These little insects were common in the grass country and amongst the bordering scrub of the forests.

120. *AZANUS UBALDUS*, Cr., and *JESOUS*, Guer.

Not numerous, but a few were taken on damp soil at Camp 1, 5,200 feet.

121. *LAMPIDES BOETICUS*, L.

Extremely common from 4,000-7,000 feet in the grass and scrub surrounding forests. Larvae were taken from the seed pods of the wild blue Lupin.

122. *HEODES ABOTTI*, Holl.

Was found to be very numerous in the grass country and larvae were taken on Dock.

HESPERIIDAE.

123. *COELIADES ANCHISES*, Gerst.

Was a plentiful species at the lower altitudes but extended on to the range up to 6,000 feet.

124. *COELIDES FORESTAN*, Cr.

Very numerous at low altitudes of 3,000 feet and was found on the range up to 6,000 feet.

124a. *COELIDES PISISTRATUS*.

Common at the north end of the range.

125. *CALAENORRHINUS GALENUS* f. *BISERIATA*, Btlr.

In most of the semi-clearings of the larger forests and in the more open lesser forests this species was fairly plentiful but difficult to secure. They are partial to patches of sunlight in the forest and settle on the undergrowth. I found it best to catch them in the late afternoon as at that time they were less inclined to move far. This was the only form noted on the hills at 6,000 feet.

126. *EAGRIS SABADIUS ASTORIA*, Holl.

A few specimens were taken at the mid altitudes of 5,000 feet, but it was not noted above this limit, though plentiful in the forest (mixed) of the lava ridges.

127. *ERETIS DIAELAE LAE MACULIFERA*, Mab.

Was taken along the edges of the forests, but not in any numbers.

128. *ERETIS MELANIA*, Mab.

Not very plentiful, but doubtless would have been seen more often had one hunted for them.

129. *SARANGESA PHYDYLE*, Walk.

Numerous on the edges of the track through the mixed forest on the lava ridges but distinctly scarce over 4,500 feet.

130. *SARANGESA MOTOZI*, Wall.

Not noted on the range proper but many seen at the 3,000 feet level.

131. *CARPRONA PILLAANA*, Wall.

A species which was noted on the lower plains and did not extend above 4,000 feet.

132. *GOMALIA ELMA*, Trim.

Was noted along the lower forests in the north and less numerous at the south. Its range appeared to be about 6,500, controlled by the distribution of its food plant.

133. *SPIALIA SPIO*, L.

This was the most numerous species of the group and occurred in the grass lands and along forest margins. Larvae were taken on *Sida*.

134. *SPIALIA HIGGINSI*, Evans.

Fairly evenly distributed along the range up to 5,600 feet and certainly more numerous below this level.

135. *SPIALIA CONFUSA OBSCURA*, Higgins.

Not very plentiful and apt to be overlooked as it is one of the smaller species of the group.

136. *METISELLA QUADRISIGNATA NANDA*, Evans.

Was very numerous along the entire range in the borders of forest up to 6,500 feet.

137. *KEDESTES ROGERSI*, Druce.

Only a few seen, mostly in low ground at 4,500 feet. It appears to favour areas which, during the rains, became water-logged.

137a. *KEDESTES CALLICLES*, Hew.

One specimen was taken at the foot hills.

138. *KEDESTES NERVA*, Fab.

This interesting insect was noted at 5,000 feet. The specimen has been identified by General Evans as above. It is the first Kenya record of this South African species. It is possible, that when more material is available, some difference between Kenya and South African examples may be detected.

139. *PAROSOMODES MORANTII*, Trim.

A few were noted in the low ground between 3,000 and 4,500 feet.

140. *ACLEROS MACKENII*, Trim.

Very common in the more open forests frequenting the undergrowth of Acanthaceae.

141. *ZENONIA ZENO*, Trim.

Very abundant in the grass lands and in the forests where certain grasses were growing and on which the larva feed.

142. *BAORIS FATUELLUS*, Hopff.

Fairly numerous in the grass and bush along the forest margins. 4,500-6,000 feet.

143. *PELOPIDAS DETECTA*, Trim.

Very numerous throughout the range and found up to 6,500 feet.

144. *PELOPIDAS BORBONICA*, Boisdv.

Plentiful, but not as numerous as the last species.

145. *GEGENES LETTERSTEDTI BREVICORNIS*, Plotz.

This was by far the commonest Skipper throughout the range and was found from 3,000 up to 6,500 feet in the grass lands particularly. Males and females were equally numerous.

ON TWO NEW RACES OF *CICINDELINAE* FROM KENYA
COLONY AND NOTES ON OTHERS.

By DR. WALTHER HORN, Berlin-Dahlem.

1. ***Dromica* (Myrmecoptera) *Mauchi***, Bates; ***albo-costata***, W. Horn
(nov. subsp.).

Differt a Dr. Mauchi Bates statura majore, 5 elytrorum costis (aut solummodo postice aut etiam plus minusve antice) flavo-tinctis, stria marginali postica antice dilatata et cum costa adjacente flavo-tincta confluenta. Long 19-23 mm. (sine labro spinaque).

1 ♂ ♀, Kitui, collected by R. Toker (Coryndon Museum and my collection).

The new race shows the ribs of the elytra quite a little shortened behind as is generally the case in the southern form of this species ("forma prioritatis," *Mauchi*, Bates). The northern form (race *purpurascens*, Bates) has the ribs generally stronger and a little longer developed towards the apex. The yellow colouration of the ribs (especially the posterior part) and the enlarged anterior part of the posterior marginal stripes of the elytra are very remarkable: it corresponds to that which I have called "Dispersions-Komponente": that means, that everywhere on the elytra an "extraordinary" yellow coloration can appear, preferring those points which show from the standpoint of the sculpture, etc., any "specialisation." In our case this specialisation is given by the ribs, in other cases it can be given by any sutural foveolae (e.g. in variations of *Dr. (Myrmecoptera), Schaumi*, etc.

2. ***Cicindela brevicollis pseudo-distans***, W. Horn (nov. subsp.)

Cic. brevicollis subsp. *vivida*, Boh., *affinis, differt elytrorum macula basali perparva; maculis 2 suturalibus anterioribus nullis, signatura tota cetera magis tenui, stria marginali flava (iterum magis tenui) semper post lunulam humeralem (posticam versus minus oblique directam) interrupta: in subsp. vivida, Boh. hac stria aut et ante et post lunulam medialem aut solummodo ante lunulam apicalem interrupta). Long 10½-12 mm. (sine labro spinaque).*

3 ♀♀ 1♂, Lake Magadi, collected in March, 1938, by van Someren (two specimens in the Coryndon Museum, two others in my collection).

This new race shows a strange mixture of an irregular reduction of the pattern, as one part of it has become narrower (the

basal spot) or is even quite missing (the two anterior sutural spots), although the middle fascia shows always its full length. The small yellow marginal line is interrupted behind the humeral lunula. The coloration of the upperside is blackish or dirty dull aeneous. The orbital plates show the rough sculpture of subsp. *vivida*, Boh., and *neglecta*, Dej. The intercoxal parts of the pro- and mesosternum are without bristles.

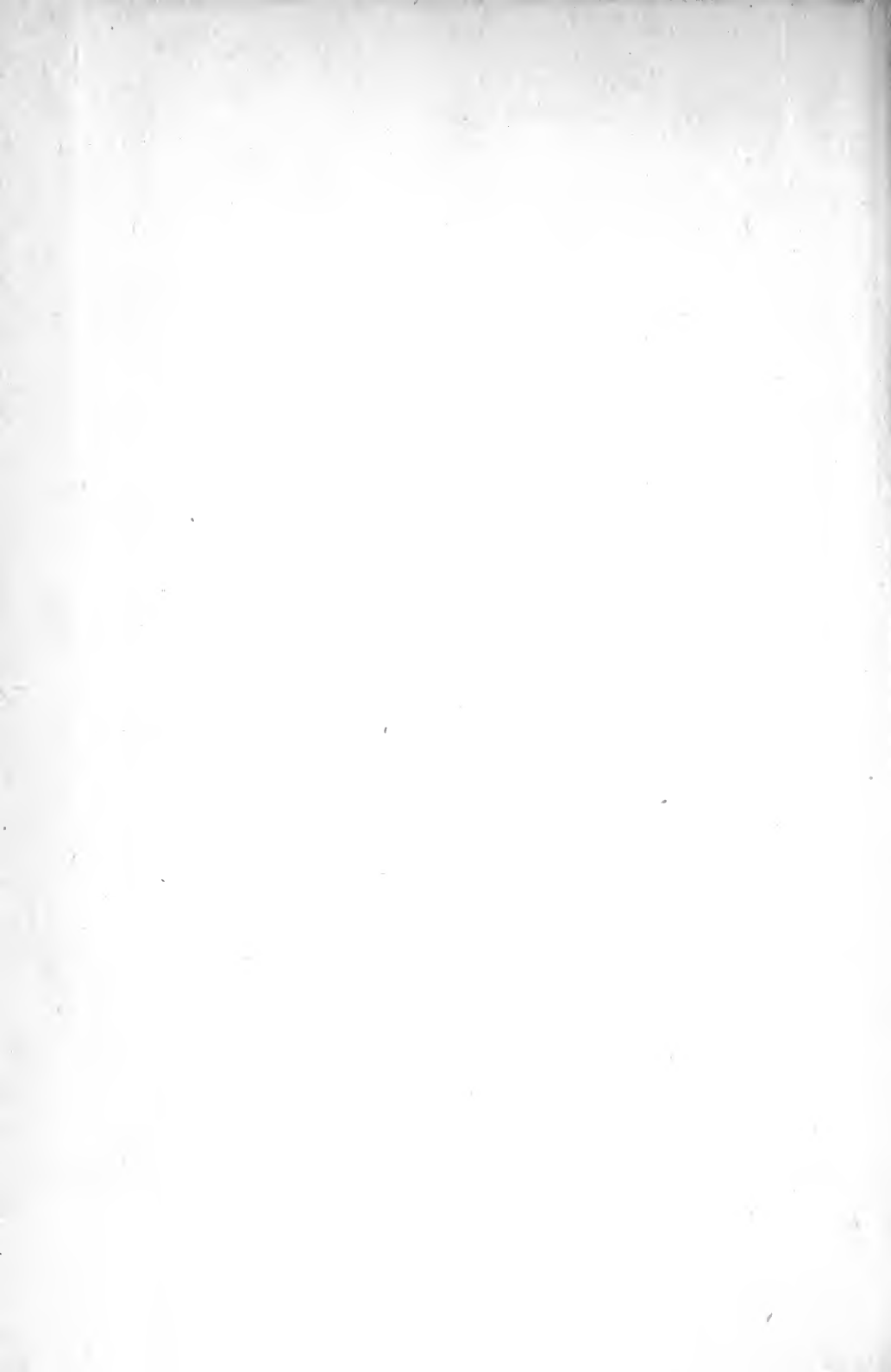
By the pattern of the elytra this new race is slightly reminiscent of the Russian *Cicindela atrata distans*, Fisch.

3. *Cicindela alboguttata*, Klug.

1 ♂ ♀ of this species were collected at Northern Lake Baringo in Kenya Colony at an elevation of 2,500 feet in January, 1938, by D. McInnes. The upperside of the specimens is dark bluish. Until now this species was only known in Africa from Erytrea and Abyssinia extending to the "old" Italian Somaliland. In Asia it occurs in S.W. Arabia and at the borders of the Red Sea.

4. *Cicindela fastidiosa Jordaniana*, W. Horn.

1 ♀ of this race from Mutha and 1 ♂ from Maktau both collected by MacArthur (the ♀ in December, 1937, the ♂ in December, 1938) show the marginal spot near the middle of the length of the elytra very much enlarged (in the form of an irregular triangle, tapering towards the disc of the elytra). The ♀ agrees in the other characters with the ordinary form but in the ♂ the whole pattern of the elytra shows a yellow-orange colour and the spot between the discoidal one behind the middle of the length of the elytra (the "endpoint" of the non-existing middle fascia) and the anterior end of the apical marginal stripe is represented by a pretty long almost vertical line.





37°40' 37°50' 38°0' 38°50'

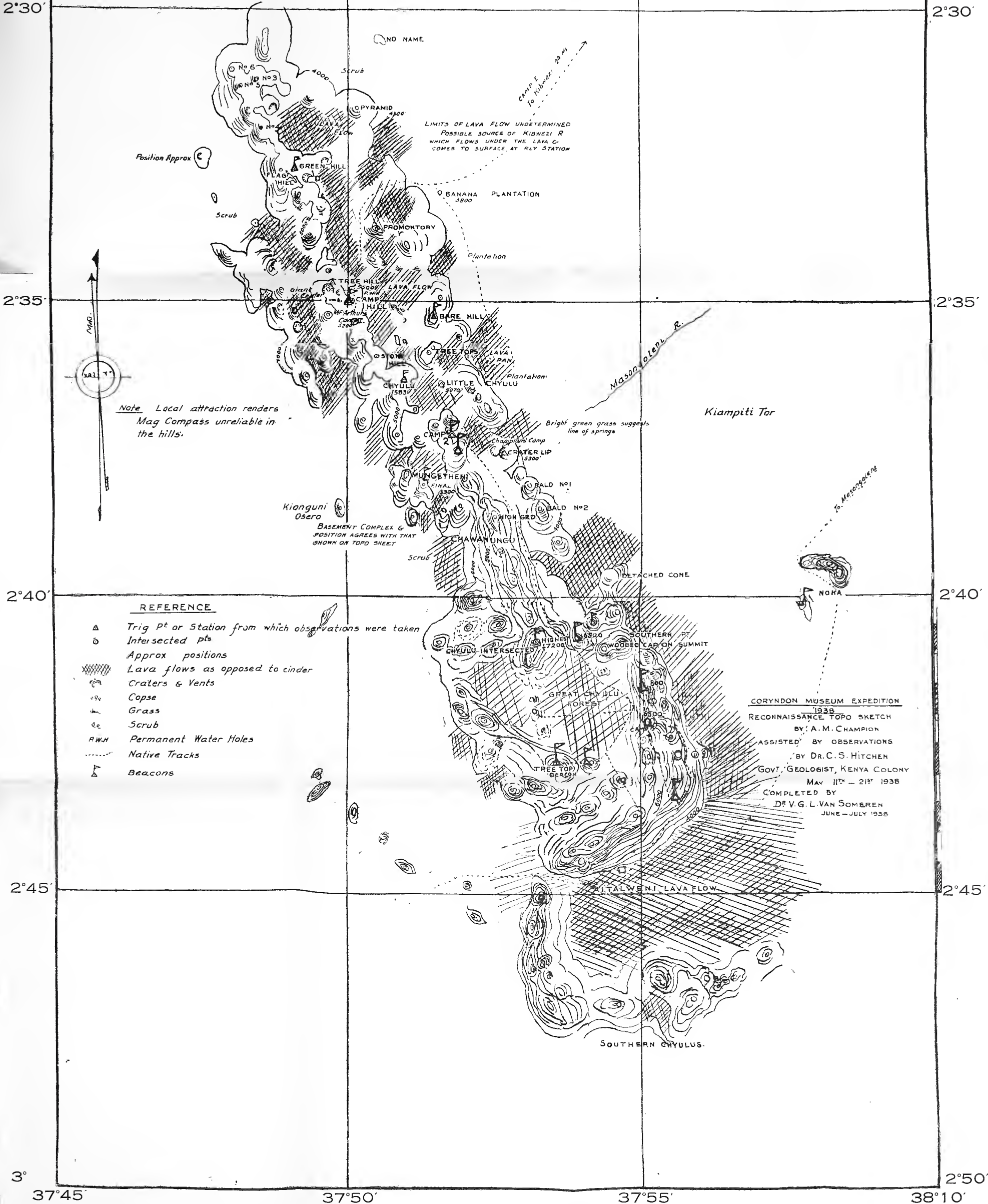
CHYULU HILLS

Coryndon Museum Expedition, 1938.

1:5000 4000 3000 2000 1000 0 5000 fms.

SCALE 1:41667 or '679" to 1 Mile.

THE RANGE IS PROLONGED N.W. IN A NUMBER OF CINDER CONES EXTENDING TO SIMBA



Position Approx

NO NAME

CAMP I
To Kibwezi 25 My

LIMITS OF LAVA FLOW UNDETERMINED
POSSIBLE SOURCE OF KIBWEZI R
WHICH FLOWS UNDER THE LAVA &
COMES TO SURFACE AT RLY STATION

BANANA PLANTATION

PROMONTORY

THREE HILLS LAVA FLOW

CAMP 2

BARE HILL

TREE TOPS LAVA PAN

LITTLE CHYULU

CAMP 1

CRATER LIP

MUNGETHENI

CHAWAYUNGU

CHAWAYUNGU

CHAWAYUNGU

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Mason oleini R.

Kiampiti Tor

To Merongobere

NOKA

SOUTHERN CHYULU

TALWENI LAVA FLOW

Note Local attraction renders
Mag Compass unreliable in
the hills.

REFERENCE

- ▲ Trig Pt or Station from which observations were taken
- Intersected pts
- Approx positions
- ▨ Lava flows as opposed to cinder
- ⊙ Craters & Vents
- ☙ Copse
- ⊙ Grass
- ⊙ Scrub
- PWH Permanent Water Holes
- ⋯ Native Tracks
- ▲ Beacons

CORYNDON MUSEUM EXPEDITION
1938
RECONNAISSANCE TOPO SKETCH
BY A. M. CHAMPION
ASSISTED BY OBSERVATIONS
BY DR. C. S. HITCHEN
GOVT. GEOLOGIST, KENYA COLONY
MAY 11th - 21st 1938
COMPLETED BY
DR V. G. L. VAN SOMEREN
JUNE - JULY 1938

37°45' 37°50' 37°55' 38°10' 3° 2°45' 2°40' 2°35' 2°30' 3°



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EDITOR:
G. R. C. VAN SOMEREN.

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EDITORIAL.

The Publication Sub-Committee has pleasure in submitting with this number, the series of folding panoramas which owing to unavoidable delay, were omitted from the first part of this volume, and which illustrate the General Narrative of the Coryndon Museum Expedition to the Chyulu Hills.

The Society is negotiating with the Museum Authorities with a view to securing recognition of the Society's Journal as the official organ of the Museum. It is hoped that contributions from the Museum staff will thus be assured. We take this opportunity of once again inviting members to submit original papers, notes, and general observations, dealing with the Natural History of Eastern Africa, for publication in the Journal.

The concluding part (No. 4) of this volume will be issued towards the end of July.

Editor.

CORYNDON MUSEUM EXPEDITION TO THE CHYULU HILLS.

PART IV.

NOTES ON THE HERPETOFAUNA OF THE CHYULU HILLS.

By V. G. L. VAN SOMEREN, F.L.S., C.M.Z.S., Etc.

INTRODUCTION.

As part of the ecological survey of the Chyulu Hills, attention was paid to reptiles and amphibia. The results of continuous search were on the whole very disappointing, and such material as was collected, although representative of the particular season, probably does not give a true index of the Herpetofauna of the hills. The paucity of material may be due partly to the fact that we were unable to detail searchers for this specific work during the whole time we were on the range.

All the reptiles and amphibia belong to the savanna or coastal-belt fauna, with the exception of *Lacerta jacksoni* and *Chamaeleo fischeri tavetensis*, both of which occur at higher altitudes such as Mts. Mbololo and Kilimanjaro, as forest species.

I am indebted to Mr. A. Loveridge for the determination of the material during his recent brief visit to Nairobi.

SYSTEMATIC LIST.

SNAKES.

PROSYMNA AMBIGUA STUHLMANI, Pfeffer.

A single specimen was taken in the grass lands on the western slope of the hills below Camp 2 at 5,500 feet. Total length 226 mm.

DASYPELTIS SCABER (L.).

Not met with on the high ground of the range; the specimen obtained was procured in a deserted banana shamba at 4,200 feet. Total length 670 mm.

TRIMERORHINUS TRITAENIATUS MULTISQUAMIS,

Loveridge.

A few examples of this lined grass snake were noted, but owing to the long nature of the grass they were able to slip away. The specimen captured was taken at 5,500 feet at Camp 2. Total length 648 mm.

PSAMMOPHIS SIBILANS (L.).

This species was fairly plentiful, but usually evaded capture. One noted them basking on the springy grass tufts, but they were on the alert all the time. There was some considerable variation in colour; one specimen was of an olive green, others blackish. The spotted throat and elongate head are distinctive features. Of the two specimens captured, one measures 775 mm., the other 710 mm.

CAUSUS RHOMBEATUS (Licht.).

This little adder was scarce; only one was noted during the three months. It was taken at 5,000 feet near the water drip. A very small specimen, 188 mm.

BITIS ARIETANS (Merrem).

A single specimen of the common Puff Adder, in the yellow phase, was taken at Camp 3 at 6,000 feet. The specimen was shot and was too damaged to preserve. It contained a full-grown specimen of *Rattus coucha* ssp. Another specimen was noted near the boys' latrine.

PYTHON SEBAE (Gmelin). Pl. A, fig. 1.

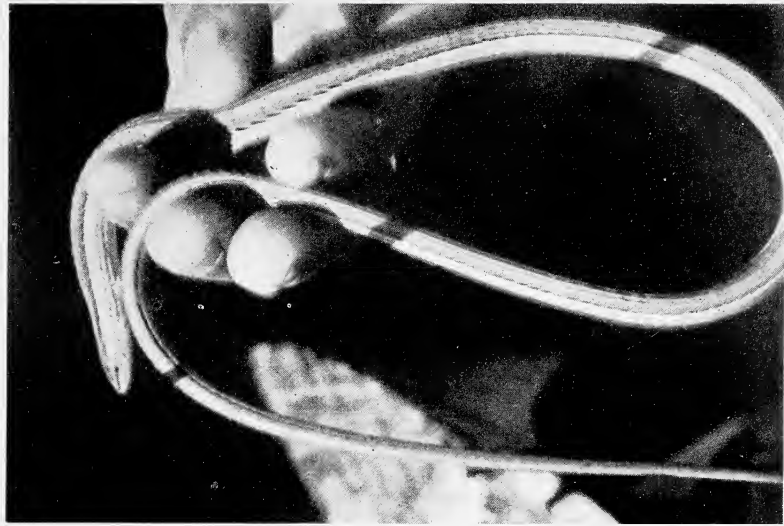
An immature specimen of some $4\frac{1}{2}$ feet was found coiled up on a tuft of grass at Camp 3, basking in the hot sun. No difficulty was experienced in capturing it as it was evidently about to slough its skin and the eyes were nearly opaque. It was kept alive for a few weeks but failed to shed its skin successfully.

PLATE A. Fig. 1.



Python sebae (Gmelin.) immature.
(PHOTO: BALLY.)

PLATE A. Fig 2.



Chamaesaura tenuior, Gunth.
(PHOTO: BALLY.)

NAJA NIGRICOLLIS, Reinh.

An immature specimen of 800 mm. was shot at Camp 1, at 5,000 feet. It was of the olive-brown variety.

LIZARDS.

AGAMA AGAMA LIONOTUS, Boulg.

Agama Lizards were noted at one place on the range proper; on the western aspect at 4,800 ft. in one of the few localities where there was any form of cliff face to the lava terraces, at Camp 1. They were, however, very plentiful on the eastern foot-hills in the old abandoned banana shambas, particularly where the lava flows showed considerable extrusion and where there were water-worn gullies. They were also as commonly found on the trunks of the giant fig trees.

Most of the specimens taken, some 17 in number, are very immature. The smallest is 85 mm., the largest 258 mm.

In the Kibwezi area the species was plentiful, many of them being in brilliant blue and red colouration, whereas the Chyulu specimens are a mottled brownish. The immature specimens are more patterned than the adults.

CHAMAESAURA TENUIOR, Gunth. Pl. A, fig. 2.

Twenty-seven specimens of this species were captured and dozens more were noted. It was indeed one of the commonest skinks of the range. It was noted in the moorland grass lands from 5,000 feet to 7,000 feet. One saw them lying along the tops of the grass tufts, and if undisturbed one could approach to within a foot or so before they wriggled off into the deeper grass or slid down on to the ground. It was very easy to sweep them up with a butterfly net. The whole series is very uniform in type of colouration; all have monodactyle hind limbs.

I have already recorded the taking of these skinks by *Gymnogenys typicus* in my report on the birds.

The Wakamba natives were loath to capture these lizards, because of their snake-like appearance, whereas they would catch *Mabuya striata* without hesitation.

On more than one occasion I noted these skinks to capture flies and moths. Specimens kept alive would take nymphal grasshoppers. The largest specimen measures 560 mm.

LACERTA JACKSONI, Boulgr.

Three specimens of this species were captured but many more were noted. They were seen on the trunks of trees growing at the edges of the forest. They were more numerous at the north and central portions of the range. They were difficult to secure except by shooting them with half dust cartridges.

The largest specimen measures 170 mm. The name *kibonotensis* applied to specimens from Kilimanjaro is now placed in the synonymy of *jacksoni*. Altitude range 5,000-6,500 feet. The greenish colouration of the fore-part, and the chrome yellow of the vent and hind limbs below are conspicuous field characters.

MABUYA MEGALURA (Peters).

This brown, Striped Skink was without doubt the commonest species on the hills, inhabiting the grass lands of all types. Thus we noted it as common on the slopes where the grass was short and tufty; on the moorlands with taller grass up to three and four feet, and on the wind-swept slopes where the grass was short and dense. There was never much difficulty in capturing them for they seldom disappeared far into a tuft of grass and if this was pressed down promptly and gradually opened up one could secure them without damage. There is some considerable variation in colour; thus some are uniform brownish above, while others are boldly striped. The size variation is great, the largest measures 260 mm. These skinks take kindly to captivity and several were kept in good condition by feeding with flies.

Thirty-four specimens were captured.

MABUYA sp.

This species was not uncommon, but much more retiring in habits, and thus more difficult of capture. Mr. Loveridge was unable to determine the species, and there is every possibility that it represents a new species. It is of a much more slender, more graceful build than *megalura*, and though bearing a superficial resemblance to that species on the upper surface, is characterised, so far as colour goes, by its bright pink fore and hind legs, whilst many examples are brilliantly pink below along the lateral-abdominal line and on the underside of the tail. In the immature, up to about 80 mm. in length, the entire tail is red.

The altitudinal range of the species, so far as we noted it, was from 4,500 feet, amongst the fallen banana leaves of the plantations, to 6,500 feet on the range proper, in the grass lands. It was more plentiful in the north and central portions of the range than at the south.

MABUYU STRIATA (Peters).

These Lined Skinks were almost invariably to be found on the trunks of the rough-barked *Erythrina*, usually those with a portion of the trunk decayed or eaten out by termites, or on those with a heavy covering of orchids, amongst the roots of which these lizards retired when disturbed. Although comparatively

bold, they appreciated the danger of capture, and if more than one attempt had been made at securing them, they sought the shelter of a crevice or hollow as soon as one came near the tree. One exceptionally fine pair evaded capture for days and eventually adopted the trick of dropping to the ground as soon as a "boy" was sent up the tree to secure them from a broken branch. Both were eventually secured by digging them out of a rat's hole into which they had disappeared on reaching ground.

The largest Chyulu specimen measures 235 mm. They occurred at altitudes about 4,000-6,800 feet.

RIOPA SUNDEVALLII, A. Smith.

Only one specimen of this skink was obtained at 5,000 feet at Camp 1.

ABLEPHARUS WAHLBERGII, A. Smith.

One immature specimen, identified as this species, was the only one noted.

CHAMAELEO DILEPIS ROPERI, Boulgr.

This handsome species was scarce on the range above 5,000 ft. but several specimens were noted and a few taken on the lower lava flows at the 3,500-4,000 feet levels. The variation in colour is enormous: many of the most spectacular are orange with very marked black spots; others again are terracotta pink. The largest males are dwarfs compared to females, the biggest of which measures 265 mm. It was most plentiful on the Noka-Italweni track.

CHAMAELEO BITAENIATUS BITAENIATUS, Fischer.

This species was numerous on the range and indeed can be considered as a montane species. Of the twelve specimens taken only one was secured on the lower ground at 4,000 feet, the remainder were from the 5-6,000 feet level. It was invariably found in the grass land and for the most part the specimens were either buffy or straw-colour with longitudinal paler stripes.

CHAMAELEO FISCHERI TAVETENSIS, Steind.

By no means a common species, and not obtained on the range proper, though specimens were noted and obtained on the lower ground at 4,000 feet. It was also noted at Kibwezi. The flattened parallel horns of this species are distinctive.

AMPHIBIA.

BUFO REGULARIS REGULARIS, Reuss.

In view of the extreme scarcity of water on the range, it is not surprising that amphibia were poorly represented. Three

examples of this species were taken. One was discovered in a disused rat hole; the other came into the banda after a rain storm, whilst the third was found amongst the grass land.

CHIROMANTIS XERAMPELINA, Peters.

This very pale species of Tree Frog was scarce; only one specimen was obtained near the Ithaba swamp at 3,000 feet, thus not actually on the range.

RANA OXYRHYNCHUS ? sub-sp.

Twenty-five examples of this frog were preserved. It is placed with a query for the entire series suggests that Chyulu material runs considerably smaller than typical. Mr. Loveridge has promised to examine the specimens in detail on his return to America. The "pickled" material does not in any way demonstrate the remarkable variation exhibited by the Chyulu specimens in life; a variation which could not be put down to sex. Excellent coloured casts of some of the varieties were prepared by Mr. Allen Turner and are on exhibition in the Museum.

Though very scarce at Camp 1 at the north end (where the only free surface water occurred), the species was more numerous in the central portion of the range, and was common at Camp 3, of the south, at 6,000-6,500 feet. In this last position, numbers were to be found in the damp rank grass along the forest edge, and it is more than probable that they breed in the numerous hollow tree trunks which hold water for a sufficient time. One could count on finding the species under the logs of timber which the porters collected and threw down by the cook-house. It is unlikely that the frogs desired the warmth: the probability is that they frequented the locality to obtain the numerous flying ants and other insects which were driven out of the timber when put on the fire.

I obtained quite a number from under the ground-sheet of my tent.

PHRYNOBATRACHUS NATALENSIS, Smith.

A few examples of this species were secured from the open grass lands at Camp 2, and were not associated with surface water.

CORYNDON MUSEUM EXPEDITION TO THE CHYULU HILLS.

PART V.

SOME VEGETATIONAL AND BOTANICAL NOTES.

By PETER R. O. BALLY, Botanist, Coryndon Memorial Museum.

The Chyulu Hills were selected for the 1938 Expedition of the Coryndon Memorial Museum for several reasons:

(a) The range was practically unknown in every respect: as far as available records show, only one very superficial survey had been made of them during the Great War with a view to finding water, but geologically, botanically, and faunistically the Chyulu Hills were an unknown quantity.

(b) Human influence on the range is practically negligible, as it is quite uninhabited. Formerly a series of small cultivations worked by Wakamba squatters existed along the eastern foot hills, but these are now derelict, as the occupants have long since been returned to their reserve. The area is now Crown Land. There are two native paths across the hills, connecting Kibwezi with Loitokitok, but these are very rarely used. The destructive grass fires of the plains do not seem to reach the forest zones; possibly they spend themselves on the steep hill-sides. Only in the vicinity of one of the native paths through the hills a few burnt patches, and one burnt cedar forest, were found.

(c) Their geographical position pointed to the Chyulu Hills as an interesting link for floral distribution—they are almost equidistant from Mt. Kilimanjaro, the Teita Hills, and from the Highlands of Machakos, rising in isolation from the vast surrounding plains.

The Chyulus are about 40 miles in length and 10 miles in width, and they rise abruptly from the 4,000 feet contour to about 5,600 feet in the north and 7,200 feet in the south. A range of such size might well have evolved a vegetation of its own, or it might—through its isolated situation—have retained floral relics which have disappeared elsewhere.

However, the first observation which was made—and which was later fully corroborated by soil analysis—was that the Chyulu Hills are of very recent origin; in fact, probably no more than a thousand years ago they were the scene of intense volcanic activity. No signs of such are now apparent, but the rugged lava flows and volcanic clinker seem as fresh as if they had hardly cooled down, and there is little evidence of weathering having set in to dull the shimmering oxide colours on the surface of the hardened magma.

The general aspect of the Chyulu Hills is that of numerous contiguous cones and extinct craters of varying size, forming a main ridge, which extends throughout the whole length, flanked on either side by rows of subsidiary cones. Several of the valleys are filled with lava flows, and lava is exposed on many of the crater rims, whereas the slopes of the cones consist mainly of lapelli.

Without considering the numerous geological indications of the very recent origin of the Chyulu range, there are many obvious signs which show that its vegetation has not yet reached its optimal development, with the exception of that on its southern portion, where between 6,500 feet and 7,200 feet a great mist forest with a canopy a hundred to a hundred and fifty feet high and with trunks of very considerable girth has established itself.

This forest certainly gives at first the impression of great age, but a closer inspection shows that its humus accumulation is still very small, and the subsoil of lapelli is very near the surface.

The almost complete lack of humus—only in the forested bottoms of some of the craters has it accumulated to some depth—and the great permeability of the subsoil, which even after heavy showers left no standing water, explains the absence of any superficial water-course or even springs throughout the range.

Under these conditions the soil can be largely discounted as a reservoir to supply abundant water for plant life, with the exception perhaps of certain crater bottoms formed of solid lava. In fact, the only place where water was obtained during the Expedition was where a hidden stratum of lava reached the surface in a deeply eroded gully. Here a constant drip of water (fig. 1) yielded about 60 gallons per day, a quantity that declined appreciably towards the beginning of July, as the dry season went on.

The state of disintegration of the lava would seem to indicate a greater age for the northern portion of the range—but the character of the forest there is less advanced than elsewhere.

On this apparent incongruity the meteorological data obtained during the course of our residence on the hills might have some bearing; weather conditions vary greatly in various altitudes, and the northern portion with an altitude of only 5,400 feet to 5,600 feet is subjected to climatic conditions which differ materially from those in the south between 6,000 feet and 7,200 feet. A possible difference in actual rainfall along the range could hardly be held alone responsible for the obvious retardation in tree growth in the north, nor could the luxuriant affores-

tation in the south be easily explained on a soil of such complete permeability.

During the three months of our Expedition the meteorological influences to which the various portions of the range are exposed were closely studied in every camp and they were found to be thus:

The prevailing wind during the period of observation was from a south-westerly direction, blowing straight from the massif of Kilimanjaro, which towers at a distance of 48 miles. While the rains lasted, i.e. to the end of May, conditions may have been fairly uniform along the whole length of the range, soil and atmosphere being charged with moisture to utmost capacity, although the southern portion with its higher altitude had a larger share of mists towards the end of the wet season.

In the early part of the dry season, however, the morning mists rose from the plains straight to an altitude of about 6,000 feet and were then driven towards the range by the wind; thus, only the southern heights benefited from their moisture, while the northern portion remained dry.

A marked difference was also noted between east and west slopes.

The western slope, which is first hit by the mist-laden wind, remained dripping wet throughout the day, even in the dry month of July, while no trace of the nightly mists remained visible after the noon hour on the slopes facing east.

It goes without saying that the capacity for absorbing moisture is intensified incalculably in forest land as compared with grassland, and thus the amount of water supply is greatly intensified in the southern end of the Chyulu Hills with its vast tracts of growing forest.

One remarkable feature in tree growth in the northern portion is the distribution of pencil cedar (*Juniperus procera*, Hochst). Pure stands of cedar were found quite commonly all over the western slopes and on lava flows in the west, while only a few stray trees could be seen on the slopes facing east. Possibly this phenomenon finds its explanation in the greater moisture of the air on the western slopes. (Fig. II, Panorama A, photo 5.)

In contrast, the vegetation on the numerous blow-holes and vents at the base of the southern portion of the Chyulus is strikingly xerophytic: they are crowned with a fringe of tree *Euphorbia* and *Cussonia*; *Aloe* and *Kalanchoe* grow between their rocks. *Catha edulis* and *Myrica kilimandscharica* are commonly associated with them (fig. III).

It is premature to give a detailed record of the flora of the Chyulu Hills; over 1,300 specimens were collected, and it will

take considerable time before an exhaustive description of this material can follow.

Furthermore, the time of collection of botanical specimens covers a period of no more than three months, and a comprehensive study could be based only on collections made during all seasons of the year.

A rough outline description of the vegetation, showing some of its most striking representatives, has been given in Dr. G. L. van Someren's general narrative on the Chyulu Expedition in the previous number of this Journal.

It was, however, possible to study one vegetational problem, rare in Africa to-day, but very obvious along the heights of the Chyulu Hills: the evolution of large mist forests, which are still extending steadily, from their initial struggling beginnings on bare, windswept, grassland.

In the northern and in the central portion of the Chyulus, *Erythrina tomentosa* is commonly the first tree to form a nucleus of more highly organized vegetation in the surrounding grassland (fig. IV). In its shelter, herbaceous plants which require shade soon begin to form a dense patch. *Erlangea tomentosa* and *Bidens seretii* with its large yellow flowers are the first of the sturdier herbs to establish themselves in closed communities, although the latter is also found dispersed in the open grassland. *Leonotis mollissima* and *Cluythia mollis* are frequently found with them. In this herbaceous thicket, a more shade loving vegetation with Balsams, Geranium, and *Viola abyssinica*, etc., appear. Gradually the thickets merge with those that have developed around neighbouring Erythrinas. *Cussonia Holstii* is the next tree to join these communities, and now the variety of trees and shrubs increases rapidly. *Ilex*, *Teclea*, *Rhus*, *Brucea*, *Oxyanthus*, etc., soon form a dense forest patch, its shaded floor covered with *Piper capense*, *Desmodium scalpe*, and several shade-loving Acanthaceae.

Other centres for commencing afforestation are the crater dips with their natural shelter from the drying effect of wind and sun, and with their greater accumulation of moisture.

Once the forest has filled the sheltered dips, it pushes its herbaceous edge further and further down the outward slopes; the trees follow. This stage is reached in the northern portion, where the forests still form numerous separate patches in the grassland, which is itself dotted with small groves and single Erythrinas. (Fig. V and Panorama A2.)

A more advanced stage of afforestation is seen in the slightly higher central section of the range; here, the forest patches are larger and more connected; they have begun to merge, sometimes leaving only narrow alleys of grassland between them



Fig. I. a constant drip of water

Fig. II. pure stands of *Juniperus procera*
(See Panorama A., No. 5.)



Fig. III. Crowned with a fringe of *Euphorbia* trees.



Fig. IV. *Erythrina tomentosa* is commonly the first tree. . . .



Fig. V. The forests form numerous separate patches.



Fig. VI. . . . leaving narrow lanes of grassland.



Fig. VII. Small enclosed areas of grassland.

Fig. VIII. In the southern portion the forest is continuous.
(See Panorama, C. 5.)



Fig. IX. Remains of the original grassland were found in its midst. . .



Fig. X. One of these small forest patches. . . .

(fig. VI) or coalescing on all sides, eventually leaving only a small enclosed area of grassland (fig. VII).

The number of species forming the forest is much increased here, and more wet forest types are encountered.

On the heights of the southern portion the forest is continuous, and no trace of its original beginnings can be seen (fig. VIII see Panorama C 5). The main block of forest spreads over an estimated area of over 20 square miles; two patches only (fig. IX) of the original grassland were found in its midst, and these will also disappear with the obvious advance of the forest from every side.

In the South, the variety of trees, shrubs, climbers, and herbs is greatest, while the grassland around does not differ materially from that found on other parts of the range. The forest line has extended far down the western slope, and it is encroaching visibly, but more slowly, on the less favoured grassland facing east. Near the forest line, small patches of trees have formed, mostly representatives from the large forest, for in this altitude *Erythrina tomentosa* is less common.

A careful analysis of one of these small forest patches (fig. X) measuring 43 paces in circumference was made. In it, sixty-odd species of flowering plants were collected and named; they show the great variety of plant life found in the Chyulu Hills, and they also go to show from which sources this recent and isolated range has drawn its vegetation: the flora of Kilimanjaro is represented, as well as that of the Teita Hills and that of the highlands of Machakos.

LIST OF PLANTS COLLECTED IN FOREST PATCH, SOUTHERN CHYULU HILLS, JUNE, 1938.

In grassland, up to 20 paces around patch:

Silene Burchelli, Otth.	Helichrysum gerberaeifolium,
Cassia Kirkii, Oliv.	Sch. Bip.
Eriosema Lejeunii, Staner et	Lightfootia abyssinica, Hochst.
De Craine.	Hebenstreitia dentata, L.
Rhus villosa, L.	Sopubia Welwitschii, Engl.
Agauria salicifolia, Hook, f.	Gladiolus quartinianus, A. Rich.
Galinum molucomum, Bullock.	Themeda triandra, Forsk., var.
Scabiosa columbaria, L.	hispidia, Stapf.
Bidens palustris, Sharff.	Asplenium anisophyllum,
	Hochst.

In herbaceous edge:

Thalictrum rhyngocarpum, Dill. et Rich.	Agauria salicifolia, Hook, f.
Berberis Holstii, Engl.	Myrsine africana, L.
Geranium simense, Hochst.	Oldenlandia Johnstonii, Oliv.
Impatiens papilionacea, Warb.	Pentas longiflora, Oliv.
Cluythia mollis, Pax.	Bidens Seretii, Scherff.
Euphorbia longecornuta, Pax.	Carduss Steudnerii (Engl.), R. E. Fries.
Phyllanthus capillaris, Sch. et Thomm.	Erlangea tomentosa, S. Moore.
Rubus inedulis, Rolfe.	Micromeria biflora, Benth.
Aescynomene abyssinica, Taub. ex Engl.	Salvia nilotica, Vahl.
Catha edulis, Forsk.	Commelina sp.
Rhamnus prionides, L'Herit.	Eragrostis chalcantha, Trin.
	Exothea abyssinica, Anders.
	Pteridium aquilinum, Kuhn.

Inside forest patch:

TREES—

Xymalos monaspora, Baill.	Rapanea neurophylla (Gilg.), Mez.
Ilex mitis (L.), Radlk.	
Schefflera abyssinica (Hochst.), Harms.	Vangueria linearisepala, K. Schum.
Olea Hochstetteri, Baker.	Halleria lucida, Linn.

SHRUBS—

Acalypha ornata, Hochst.	Allophylus repandens, Bak.
Gymnosporia sp.	

CLIMBERS—

Taccazzea sp.?	Senecio syringifolius, O. Hoffm.
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EPIPHYTES—

Perperomia reflexa, Dietr.	Polystachya golungensis.
Kalanchoe Petitiiana, A. Rich.	Polystachya cultriformis (Thou.), Lindl.
Pilea ceratormera, Wedd.	Asplenium theciferum, Met.
Aerangis Thomsonii, Schltr.	var. concinnum, Schrad.
	Polypodium lanceolatum, L.

HERBACEOUS PLANTS—

Piper capense, L.f.	Echinochloa sp.?
Desmodium scalpe, D.C.	Calanthe Volkensii, Rolfe.
Anthriscus sp.	Asplenium praemorsum, Sw.
Pycnostachys deflexifolia, Bak.	

I am greatly indebted to P. J. Greenway, Esq., systematic botanist of the East African Agricultural Research Station, AMANI, Tanganyika Territory, for his courtesy in identifying those plants appearing in the above list, which could not be matched in the herbarium of the Coryndon Memorial Museum.

SOME KINANGOP SUNBIRDS.

By SIR CHARLES F. BELCHER.

Four species of Sunbird commonly occur in the valley of the Chania at South Kinangop. These are *Nectarinia famosa aeneigularis*, Sharpe, the Kenya Malachite Sunbird; *Nectarinia tacazze* (Stanley), the Tacazze Sunbird; *Drepanorhynchus reichenowi*, Fischer, the Golden-winged Sunbird; and *Cinnyris mediocris mediocris*, Shelley, the Kenya Double-collared Sunbird. The association of these four species was observed long ago by Sir Frederick Jackson (*vide* what is unquestionably an original note of his in the recently-published "Birds of Kenya and Uganda," edited by W. L. Sclater, at page 1342 in the third volume). So far, during a residence of nearly twelve months on the Kinangop, I have not met with the Bronzy Sunbird (*N. kilimensis kilimensis*, Shelley) which might be expected to occur and has been taken as near as Limoru at an altitude not more than 1,500 feet below us, but which I think must be regarded as definitely a bird of, in these parts at least, lower altitudes than the Kinangop Plateau; and another species not yet noted is the Scarlet-tufted Malachite Sunbird (*Nectarinia johnstoni johnstoni*, Shelley) which though quoted by Sclater as occurring on Kilimanjaro and Kenya Mountains only, certainly is found as well on the higher parts of the Aberdares; and, as I am informed by Dr. van Someren, has once been noted on Major Ward's estate which is at much the same level as the main run of the Kinangop close in to the mountain, i.e. about 8,500 feet above the sea. It would doubtless be an occasional visitor only from the higher levels.

Field identification of the four commoner birds is easy enough, in both sexes. *Drepanorhynchus* is marked out from the other three by the bright yellow wing-bar which both male and female have. I believe there is a song which at times the male produces, but the note commonly heard from both sexes is a harsh "sawing" one. The male of *N. famosa* has yellow pectoral tufts, and the female has traces of them too; but conspicuous as are these tufts in the hand, or when one has to do with a skin, I have never yet been able to make them out in the living bird. What is a certain mark is the general bluish colour of the male below the chest, and in the female the tint of yellow on the underparts, not flammulated with grey feather-centres as is the brighter yellow-breasted *N. kilimensis* female, supposing that to be here a possibility. It is remarkable that Sclater does not mention the blue in the plumage of the male. The female is smaller than that of *N. tacazze* and is without any light superciliary stripe. The male *famosa* has a song in three sections, beginning with a few sharp chirps, then quickening into shorter ones,

and ending with a confused warble, a sort of "cheedle-eedle." *N. tacazze* male must be rather difficult to tell on a brief glance from the same sex in *N. kilimensis*, but where the latter bird does not occur there is really nothing to confuse with it, it being the only long-tailed Sunbird up here without obvious blue in the plumage, and also without the yellow wing-bar of *Drepanorhynchus*. Jackson (p. 1319 of the work above-mentioned) once saw a full-plumaged male *tacazze* in a Nairobi garden and says that it was quite unmistakable alongside a pair of *N. kilimensis*; there is a gloss of violet or violet-lilac on the breast, shoulders, and upper tail coverts of *N. tacazze* which is not found in *N. kilimensis* and this may always be visible to good sight as the bird moves about. In the skin it appears only in certain lights, the same feathers having otherwise the bronze iridescence which characterises the plumage generally, except on the abdomen and wings, which are dull black. So far, I have not traced any song to the male of *N. tacazze*, only a series of chirps; but most likely it does sing occasionally, like the greater number of Sunbird species.

Both male and female of *Cinnyris mediocris* have the short tails which are characteristic of that genus, so that they cannot be mixed up in the field with any of the "long-tails" as regards the male, and the smaller size and shorter bill renders it unlikely that one would confuse the female with that of any of the three other larger species. In the male the scarlet breast-patch, and the yellow pectoral tufts, are readily observable in the field; though the tufts are not constantly in evidence, they are shown at times, not concealed as in *N. famosa*. The male has a very pleasant little warbling strain.

There are some differences in habitat which should be noted. *N. famosa* stands apart from the rest in that it is a bird of the open, loving patches of Hypericums, nettles, and *Leonotis* out on the grassy plains as well as flower-gardens and the river-side scrub which it occasionally visits. The nettles and *Leonotis* are usually met with on or about the sites of the manyattas of departed Masai, and in these places when there is a good supply of flowers *famosa* is extraordinarily plentiful; in October you may see a dozen males round one small clump of tall nettles with the Sasumwa (*Hypericum*) trees growing above them. But I have never yet seen any other kind of Sunbird in such places. I am aware how dangerous generalisations are when one is saying anything about birds, and I daresay if I had watched longer I should have seen some if not all of the other three. Meanwhile one can but say what one finds. I have come across a good many nests of *N. famosa*, and they have all been built in low bushes or at least within hand reach, and all well away from the immediate valley of the river Chania. *N. tacazze*, *D.*

reichenowi, and *C. mediocris* are all birds of the riverside trees and scrub. *Mediocris* may tend to go a little farther away from the stream at times than the other two, and I should say it was numerically the most plentiful. It is usually in pairs. I am told by people who have extensive gardens that *Drepanorhynchus* is far more shy, and less often seen close about the house, than the others. On the other hand in the valley of the stream it is more conspicuous than the rest, and I should say easily outnumbered *N. tacazze*.

With all four species, nesting seems to take place at almost any time between mid-May and the end of the year, that is to say at any time except during the dry season of the first three or four months. But it is not so much one continuous season as two, linked by casual nesting; or perhaps it is that there are two peaks in the same long season, one about June and the other, during which the activity is much greater, in October and November, after which it tails off with the drying of the vegetation.

To begin with *N. famosa*, I may say that this is the only Sunbird of whose nest you can feel absolutely certain at a glance and without seeing the birds. As said above, the localities chosen are away from those where the other Sunbirds nest. Then the nest itself is distinctive. The other three are often hidden in masses of *Usnea*: *famosa*'s nest is always unencumbered and unhidden. It is more spherical than the others, and carries so much ornamentation (if that is the idea) of cocoons on the outside that the white patches look like fids of wool and render the nest conspicuous. A very favourite site is in the middle of a clump of low hypericum bushes at a height of three or four feet from the ground. The entrance, which is as usual with Sunbirds at one side near the top, has no projecting porch. The interior of the nest is thickly lined with vegetable down, fur, and often feathers.

I have found five pretty certain nests of *N. tacazze*, although in the case of only one did I make absolutely sure by securing the female. I find it far more exciting to try and identify nesting birds with the aid of glasses alone, and regard having to shoot one as rather a confession of failure. The other four nests were in all respects like that from which I got the bird. All are built mainly of *Usnea*, which unfortunately does not serve to distinguish them from the nests of any other river-building Sunbird in a locality where nine out of ten Passerines use this material when nesting in trees near the stream. One characteristic all five nests possess which I find in none of the other three species and which I am therefore disposed to consider as diagnostic, and that is a thick pad of feathers as lining which

generally show up also at the entrance. Three out of the five nests have a longish smooth "beard" of *Usnea* below the entrance, looking as if it had been smoothed down level with some care. A fourth has traces of this, but the fifth nest has neither beard, nor the long broadening attachment above the nest which all the other four exhibit. But in one undoubted nest of *Cinnyris mediocris* there occur both beard and over-nest attachment, so that neither of these can be called distinctive of *N. tacazze*. Most nests of *N. tacazze* are built relatively high up in the *Hypericum* trees, say at twelve feet and over; one only, hanging over the river from a projecting juniper bough, was within reach of a crook-handled walking-stick. All may be described as pendent.

Common as is the bird, the nest of *Drepanorhynchus* is for me a comparative rarity and I have only one of which I feel sure, though another from which one or more eggs fell and broke is very like it and probably not *C. mediocris* the other possibility. Both these nests are small for the bird, have no beard or upper long attachment-strip, are lined throughout with vegetable down only, without feathers. Both were built within hand-reach and not at all concealed, one in a *hypericum* bush and the other near the top of a shrub with fairly broad leaves. This is the one I am not so certain about, and it differs from the identified nest in having something of a projecting porch of thin stiff grass-stalks which are also used as an overall binding for the nest as a whole. It must be said, however, that this grass is also conspicuous about the entrance of the identified nest, though without forming a porch. The latter is largely built of *Usnea* which is only present in a small quantity in the other. Both nests are well dotted on the outside with bits of grey-white insect webbing, but not so extensively as happens with *N. famosa*. It is a curious thing, but in at least four cases where I have seen the female of *Drepanorhynchus* building, without my disturbing her in any way or her exhibiting any embarrassment at my presence, a later visit showed the nest to have been either abandoned or carried away. All nests of this species that I have seen have been within six feet of the ground, and two or three of them within a couple of feet of it. Fairly close thickets of *Leonotis* on the river bank, or spots about which there is a good growth of *hypericum* and thus a certain concealment of the immediate locality, are favoured.

Of the nest of *Cinnyris mediocris* I have very little definite to say. My one absolutely identified nest (from the eggs and presence of both birds at it) would pass for a nest of *N. tacazze* (see above) from its beard and long lead-down above the top, but is at once distinguishable by its lining, wholly of seed down,

feathers being conspicuously absent. Also, like most nests both of *N. tacazze* and *Drepanorhynchus*, it has some of the thin wiry grass about the entrance. Any height seems to suit this bird to nest at, and the nest is rather fixed-in to *Usnea* than pendent.

But bulky as the nest is, the inside cavity is noticeably smaller than in any of the nests of the other three species, shallower a good deal for instance than that of *Drepanorhynchus* which seems to be generally no larger a nest. This particular nest was at six feet from the ground in a *Hypericum*, attached to an outer branch, not hanging free in the air as the nest of *N. tacazze* generally does, but not greatly concealed unless it were by being fitted in as it was to a clump of the same *Usnea* of which material it is itself constructed. Another nest was much smaller, but unfortunately it was not preserved though the pair of eggs are certainly those of *C. mediocris*.

Now a word as to the various eggs. Those of *N. tacazze* appear to be far the largest. One taken 27th July measures 21 x 14, one taken 12th September 20.5 x 15, and a third, taken 6th November (this was the one identified from the bird being obtained) 21 x 13.5. I have a still larger egg, which was too far gone to preserve intact but measures about 22.5 x 13.5. These eggs cannot be mistaken for any of the others. Only one egg seems to form a full clutch. At the other end of the scale come the eggs of *Cinnyris mediocris*, two to the clutch. Two sets measure as follows: one taken 12th November 17 x 11.5, 17.25 x 11.75, and one taken 19th November 16 x 11.5, 16.25 x 11.5. These might possibly be confused with eggs of *N. famosa*, of which three clutches, one taken on the 12th October and the other two two days later, measure respectively 17.5 x 12.75, 17 x 12.5; 18.75 x 13, 19.25 x 13.5; and (a single) 18 x 12.75. It will be seen, however, that there is no actual overlapping, so far as my examples show, between these two species, and the nests could hardly be mixed up. My sole identified egg of *Drepanorhynchus* measures 20 x 14; it may be that this bird's egg-measurements will turn out therefore to overlap those of *N. tacazze*, but this one egg is much broader in proportion to its length, more of a true oval and less elongate, than the eggs I have of *N. tacazze*. I am told locally that *Drepanorhynchus*, like *Tacazze*, lays only one egg. There is so much uniformity running through the eggs of all Sunbirds, with their ground of greyish or greenish white and plentiful freckles of shades of grey and brown, usually darkening at the cap, that I cannot be sure that any of my eggs exhibit markings characteristic of and peculiar to the particular species. In the same species some are relatively dark, some light. Size is probably a better criterion.

NEW AND LITTLE-KNOWN LEPIDOPTERA FROM KENYA AND UGANDA.

By V. G. L. VAN SOMEREN, F.R.E.S., F.L.S.

As I have already dealt with the groups to which the following insects belong (with the exception of the Lycaenids), and as it will be some considerable time before the opportunity arises for revision, I have thought it advisable to publish this short paper now.

ACRAEA MIRANDA, Riley. Pls. 1 and 2, figs. 5 and 6.
Ref.: *Entomologist*, 1920.

This species was described as long ago as 1920, but was not included in Seitz' *Macrolepidoptera*, African Section, *Rhopalocera*; and I overlooked the species when, in 1925, I published the section dealing with the *Acraeas* of Kenya and Uganda.

The description was based on a small series collected by the late F. C. Selous near the "Gwasi Nyeri" (probably at Archer's Post on the Northern Guasso Nyiro) in 1912, and others taken at Namanga, on the Kenya-Tanganyika border, in 1916. In 1928, the British Museum received additional material from Merille on the Marsabit road, and a female from Berbera in Somaliland.

The material which I have examined was taken by Mr. J. P. de Verteuil, in a dry river bed 20 miles south of Muddo-gashi (half-way between the Lorian Swamp and the Tana River). About a dozen specimens were taken, and of these a pair were presented to the Museum.

It will be observed that the species has a fairly wide distribution, but it is remarkable that it has not occurred in the numerous large collections which have passed through my hands during the last ten years.

The insect is very distinctive, both above and below, and should not be easily overlooked.

A brief description is as follows:—

MALE.—General colour bright orange-red with black borders. F.-w. ground colour bright orange-red to brick-red; narrowly black along the costa and outer margin, with the black extending up the veins in gradually increasing length from the hind-angle to the apex. Sub-apex with an oval ochreous transverse "bar" reaching from the costa to vein 4, this patch outlined with black proximally and accentuated distally by a black patch filling the ground of areas 4-5 contiguous to the ochreous mark. At the end of the cell is an oblique black line crossing the bases of 4 and 5. H.-w. ground colour as fore, with the underside

pattern showing through. There is a small black dot toward the base of the cell. Marginal border black with an extension up along the veins, so that the inner edge of the border has a dentate appearance. The distal half of the abdomen is white; basal half black with white bars.

Underside: F.w. orange pink. The black line at end of cell is repeated as also the ochreous sub-apical bar, outlined with black proximally, but distally bordered with a greyish patch; the ends of the veins are very narrowly black on greyish. The margin of the wing is narrowly black. H.-w. with a very distinctive pattern on an ochreous ground; base of wing crossed by a narrow black line; pinkish-red marks are present at base of 8, 7, and 1c. Cell with a black dot sub-basally; the disc of the wing crossed by a pinkish-grey curved band outlined in black which starts at mid point on costa, passes through the apex of the cell, then toward the inner fold where it extends upwards in 1a. Then follows a band of the ochreous to naples-yellow ground and beyond this the wing carries a wide border of orange interrupted by greyish lines along the veins, and sharply cut distally by a sub-marginal black line beyond which the border is greyish ochreous. The wing fringe is white. The underside of the abdomen is ochreous.

FEMALE.—Somewhat like the male, but not so reddish-orange, and the black of fore- and hind-wings not so intense. The abdomen is orange-ochreous with black and white bars to each segment, and with a dorsal black line.

The undersurface is very much as in the male, but the pinkish orange is less strong on the discal curved band.

ACRAEA CONRADTI, Oberth. Pls. 1 and 2, figs. 1—4.

Originally described from the Usambara Hills in Tanganyika Territory, and also recorded from Nyassaland, this species has not hitherto, to my knowledge, been taken within the Kenya boundaries.

A small series has now been obtained from the Teita Hills from the forests of Wandanyi and Mbololo; it also occurs less plentifully on Bura.

MALE.—General colour rich brick-red with black apices and borders.

F.-w. ground colour brick-red for the basal half to as far as the end of the cell then to the hind angle where it stops short of the black border which again is continuous with the black of the distal half of the wing and along the costa. There is a slight reddish scaling in the base of 3. There is a transparent sub-apical bar crossing about the centres of 4-6. There are blackish inter-nervular streaks from 2 to the apex.

H.-w. ground colour brick-red, slightly dusted over the base with blackish scaling; marginal border broadly black, with the inner edge angled at 5, and bluntly serrated by extensions of the black along the veins and less so in the interspaces. The base of the wing carries black spots as follows: three spots cross the base of the wing, in 1a, sub-base of cell, and sub-base of 7. Then follows a double row: two in 1a, two in 1b set rather distad, then two large ones in 1c, followed by two large ones, one in the cell and one at the base of 2; then two small ones at base of 4, one at base of 5, one in 6, then a larger one sub-costa in 7. The inner margin of the wing is yellowish, over 1a and 1b.

Underside: Orange basal area as above but duller; the distal half of the wing is greenish-ochreous with blackish along the veins and with narrow blackish inter-nervular streaks.

H.-w. ground colour orange-ochreous over the disc, slightly more greenish over the base and over marginal border; black spots as above but more pronounced but the border is blackish only along the veins with the internervular blackish streaks widest proximally and tapering off distally and not reaching the edge which is narrowly black.

The males have a superficial resemblance to *Ac. baxteri* which also occurs on the hills, but they lack the basal black on the hind-wings found in that species (fig. 2).

FEMALE: The ground colour of the fore- and the hind-wings is a semi-translucent pinkish-orange; the distal portion of the fore-wing is less strongly scaled with black than in the male more particularly in the bases of 3-5 so that the sub-apical transparent bar appears wider. The black spotting of the hind-wing is as in the male with additional spots at the base of 4 and sub-base of 5. The marginal border, however, differs from that of the male; the black is limited to black scaling along the veins widest at the margin and tapering proximally, with the internervular black streaks smaller and reversed.

Underside: F.-w. as above but duller and the marginal border and apex more greyish with slightly orange internervular streaks. The hind-wing is more yellowish than above especially along the inner fold and on the border. The black spotting is similar to above but more distinct, whilst the border streaks are slightly less heavy. Fig. 1 represents a normal female, whilst figs. 3 and 4 are slightly aberrant as shown; in the one there is a reduction of black spots and markings; in the other, an increase.

LYCAENIDAE.

PSEUDALETIS BUSOGA. Sp. nov. Pls. 1 and 2, fig. 11.

This species was submitted to Prof. Poulton in 1931. It was not represented in the British Museum, or in the Hope

Department at Oxford; nor could it be matched with specimens in Tring or in the Hill Museum. (G. Talbot.)

It bears a strong superficial resemblance to *Aphniolaus pallene* for which it was at first mistaken in the field. It was obtained at Jinja, Uganda, in 1931, and has remained unique.

DESCRIPTION: FEMALE.—General colour creamy white with slight yellow to ochreous suffusion at the base of the fore-wing and along the hind edge. A large black spot is present at the apex of the cell. The fore-wing is narrowly edged with black and for a short way along the costa. The hind-wing is less narrowly black edged with a slight yellowing at 1c; two fine black tails are present, one on vein 1b, the other on 2. The abdomen is strongly yellow above, greyish below, and with long brownish hairs on the anal extremity.

Underside: Similar to above, but with an additional black spot in the fore-wing at mid in 4; the anal angle of the hind-wing is more definitely yellow and carries two small black spots on either side of the lower tail.

Distribution: Only known from Jinja, Uganda. Type, female, March, 1931, in my collection.

STUGETA BOWKERI KEDONGA. Subsp. nov. Pls. 1 and 2, figs. 9 and 10.

DESCRIPTION: The points of greatest value are on the underside.

FEMALE.—Differs from the race *mombasae*, Btlr. (which has a very whitish underside) in having a much darker marginal border to fore- and hind-wings; in having the fore-wing dark, post-discal band wider throughout especially in areas 1b-6 so that the inner edge is not so notched by the white ground in 3 and 4.

In the hind-wing the dark discal band is darker and wider and fills the areas enclosed by the brown lines in 1b and 2.

On the upper surface, the blue is darker, and there is a reduction in the size of the white markings in 2 and 1b of the fore-wing, and those of the hind-wing in areas 3-6.

The males differ in a corresponding fashion; the dark areas being greater above and below.

Distribution: I have now taken and bred a considerable number of this race from that portion of the Rift Valley stretching from the Ngong Escarpment to Lake Naivasha. The differences are constant throughout the series of twenty-odd examples and cannot be matched by toptypical *mombasae*, from the coast belt of Kenya, inland to Teita. Type, female, Ngong Escarpment, Dec., 1937, in my collection. Para types, ten females.

Figs. 7 and 8 of Plates 1 and 2 depict the race *mombasae*.

NYMPHALIDAE.

CHARAXES DESMONDI. Sp. nov. Pl. 3, figs. 1 and 2.

This species was submitted to Prof. Carpenter, who writes as follows: "Your specimen is not like any of the *brevicaudatus* in the British Museum—indeed it is not like any *cithaeron*! The narrow orange margin to the hind-wing and the black-centred tails are very peculiar, and the underside markings are different in detail. It looks like another species."

This interesting new charaxes is described as follows:

MALE.—Fore-wing rich deep blue-black, with slightly bluer reflections basally. A narrow blue streak at base of 5; below this a larger spot in 4, then a more rounded one sub-basal in 3; with another directly below in 2. There is a long blue streak in 1a, two spots in 1b, sub-marginal and smaller spots in 2-4 followed by spots of increasing size and white in colour in 6-7. On the edge of the wing are orange spots, two in 1b, then one each from 2-7. Hind-wing blue-black with a blue discal patch, sharply defined above and distally and only slightly paler toward the inner fold where the long hairs are greyish to buff at the anal angle.

This blue patch, much bluer than in *cithaeron*, extends on its upper edge to the middle portion of 6, reaching to the base of 5, then through the apex of the cell. The outer edge is defined and slightly indented by the black scaling extending for a short way up the veins. There are very small blue internervular spots along the sub-margin to 6, and all along the edge, from the anal angle to 7 is a marked orange line discontinuous only at the veins. The two tails are relatively short and entirely black.

It will be observed therefore that the main point of difference between this new species and *cithaeron* are: the reduction in and the darker blue of the fore-wing spots; the darker blue of the hind-wing patch; the almost black border with very small spots which are not continued round the upper angle of the wing; the dark orange *parallel-sided* marginal line; and the black tails.

Underside: Ground colour olive brown, less brown than in *cithaeron*.

F.-w. olive-brown shading to dark grey on the hind margin in area 1a, and more strongly golden in the cell. The cell is crossed by three blue-black white outlined bars; at the end of the cell are two narrower black lines. There is a small black spot at root of vein 2, a crescentic mark at base of 2; there are three U marks in the post-discal area, one indistinct in 1b, one in 2 and the third in 3, slightly white-lined distally. The "eye-spot" in 1b is golden proximally, mauve distally and carrying



11

Upper surfaces.
 Figs. 1, 3 & 4. *Acraea conradii* Oberth. ♀; Fig. 2, male *Ac. conradii*.
 Figs. 5 & 6. Male and female *Acraea miranda* Riley.
 Figs. 7 & 8. *Stugeta bowkeri mombasae*. Btlr. male and female.
 Figs. 9 & 10. *Stugeta bowkeri kedonga*, van S. Male and female.



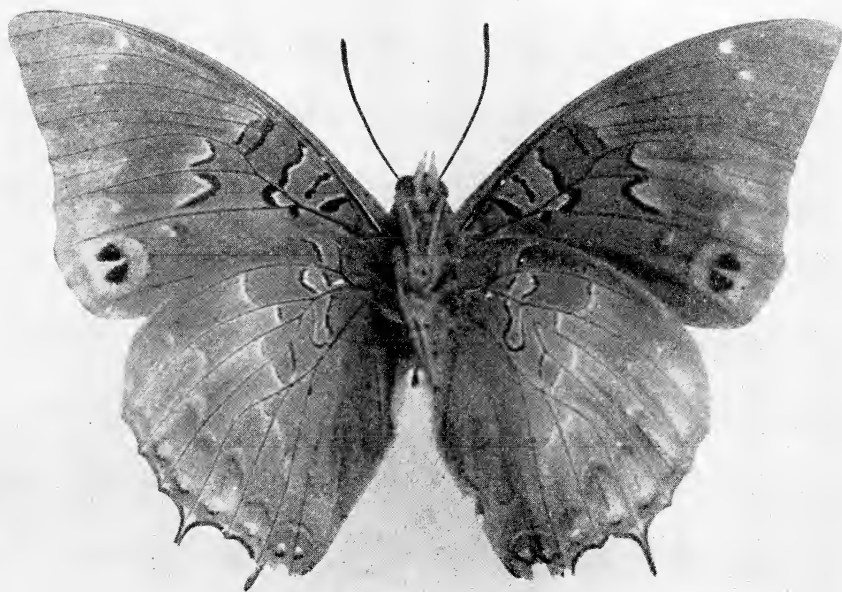
PLATE 2.
2



11

Under surfaces.
 Figs. 1, 3 & 4. *Acraea conradtii* Oberth. ♀; Fig. 2, male *Ac. conradtii*.
 Figs. 5 & 6. Male and female *Acraea miranda* Riley.
 Figs. 7 & 8. *Stugeta bowkeri mombasae* Btlr. male and female.
 Figs. 9 & 10. *Stugeta bowkeri kedongan* van S. Male and female.

PLATE 3.



Charaxes desmondi van-S.
Upper and under surfaces. (Male.)

2

4



1

3

Figs. 1 & 2. *Charaxes druceanus proximans*. J. & T. (upper surfaces, male and female.)
Figs. 3 & 4. *Charaxes druceanus teita van-S.* (upper surfaces, male and female.)

two blue-black ovate spots; there is a golden spot in 2, 3, 4, 5, then white ones in 6 and 7. The margin is golden shaded, especially internervularly.

H.-w. ground colour olive-brown. Two fine black lines cross area 8 toward the base; two at base of 7, a constricted U crosses the cell obliquely. A very faint whitish line crosses the disc, just internal to the mid-point in 7, through the sub-base of 6 thus set inward, then through the sub-base of 5, through the base of 4, the sub-base of 3, thus distad to the one above, and then passing obliquely to the inner fold above the anal angle. There is then a sub-marginal series of V marks extending from 1b to 7, that in 6 set in somewhat. The marginal golden to orange line is again more parallel than in *cithaeron* but the blueish-mauve spots just internal are more strongly marked, double at the anal angle, and extending up to 5.

F.-w.: There is thus a difference in the underside of the two species, the most marked one being the position of the spot and crescentic mark in at the root of vein 2, not distal to it, and the mark in area 2 being set in toward the base and not reaching the root of vein 3 as in *cithaeron*. The third line in the cell is placed more proximally, thus away from the two lines at the end of the cell. In the hind-wing the lines which pass through the cell and the sub-base of 7 are more approximated to each other and nearer the base.

The female is at present unknown.

In attempting to discover the relationship of this insect to *cithaeron* and *xiphares nandina*, I have made dissections of the genitalia of all three. It was not surprising to find hardly any difference either in "wet" or dry preparations. In *cithaeron*, the penis is armed with two spines, one at the proximal third, the other at the junction of the distal and mid third. In *desmondi* there is only one projection with double short spines at the proximal third (measuring from the end of the penis sheath).

Distribution: The Teita Hills, Wandanyi-Mbololo Forests.

Type: Male, October, 1938, 5,000 feet; in the Coryndon Museum. Taken at fermenting sap from a wound in a tree. Para-type, one male.

CHARAXES DRUCEANUS TEITA. Subsp. nov. Pls. 4 and 5, figs. 3 and 4.

This race of *druceanus* has been represented for many years by a female taken by Canon Rogers, on the Teita Hills, and tentatively associated with the race *kivuanus*. It is in the Hope Department, Oxford University Museum.

I have now examined some twelve males and four females, and have no hesitation in accepting them as representing a race, distinct from either *kivuanus* or *proximans* the Kenya highland form, or *moereus* of Transvaal. A representative pair were submitted to Prof. Carpenter, who writes as follows: "The *druceanus* is also a problem. I could not match it in the British Museum. . . . The female from Bura differs from *kivuanus* by the broader pale band on the forewing, which is also darker than in *kivuanus*; indeed the Bura specimen, in colour of the band, is like a Natal specimen in the Hope Department. On the underside, the silver, and anal markings are nearer to *kivuanus* than *proximans* or to *moereus*, Jordan, from Transvaal. On the sub-apex of the fore-wing, the pattern of light and dark is more like that of *kivuanus* than *moereus*, i.e. the end of the black wedge on vein 5 is in contact with the black patch in area 4 and through this with the more proximal patch on the costa at the end of the cell. In *moereus* the distal triangular blade (inverted) is isolated at its apex which does not quite reach vein 5. . . . The male in some ways (deep colour) is like *moereus*, but it is more purple. I have seen no male with such a rich purple gloss. Its subapical fore-wing markings, like those of its female, differ from *moereus*."

DESCRIPTION: Female (type) differs from *proximans*, J. & T., by the different formation of the light fore-wing bar which in its broad area through 1a to 3 is wider, extending more proximally, and in its distal portion through areas 4-7 is narrower, more defined, and straighter on its distal edge. This narrowing is in part accounted for by the greater size of the inverted triangular black patch, which with its base on the costa extends down to 5 and is then continuous with the well defined large black spot in area 4, which again links up with the large black mark beyond the end of the cell, thus entirely enclosing the yellow mark in areas 5 and 6. The black transverse bar at the end of the cell is quadrate. The marginal black border is blacker and more defined. There is some similarity between this Teita race (females) and *kivuanus*, hence the previous association of Rogers' specimen with that form, but the fore-wing band is darker and broader.

Underside: This is more boldly patterned; the black marks are larger and more extensive, and the dark chestnut areas are darker than in *proximans*. The cell bars, and the black marks at bases of areas 1b-3 are darker, those in 2 are coalescent.

Male (co-type) differs in much the same directions as the female described above. It is very much more richly coloured than any other race and has a very strong purple bloom throughout the basal areas of the fore-wing. The marginal black

1

2

3

4

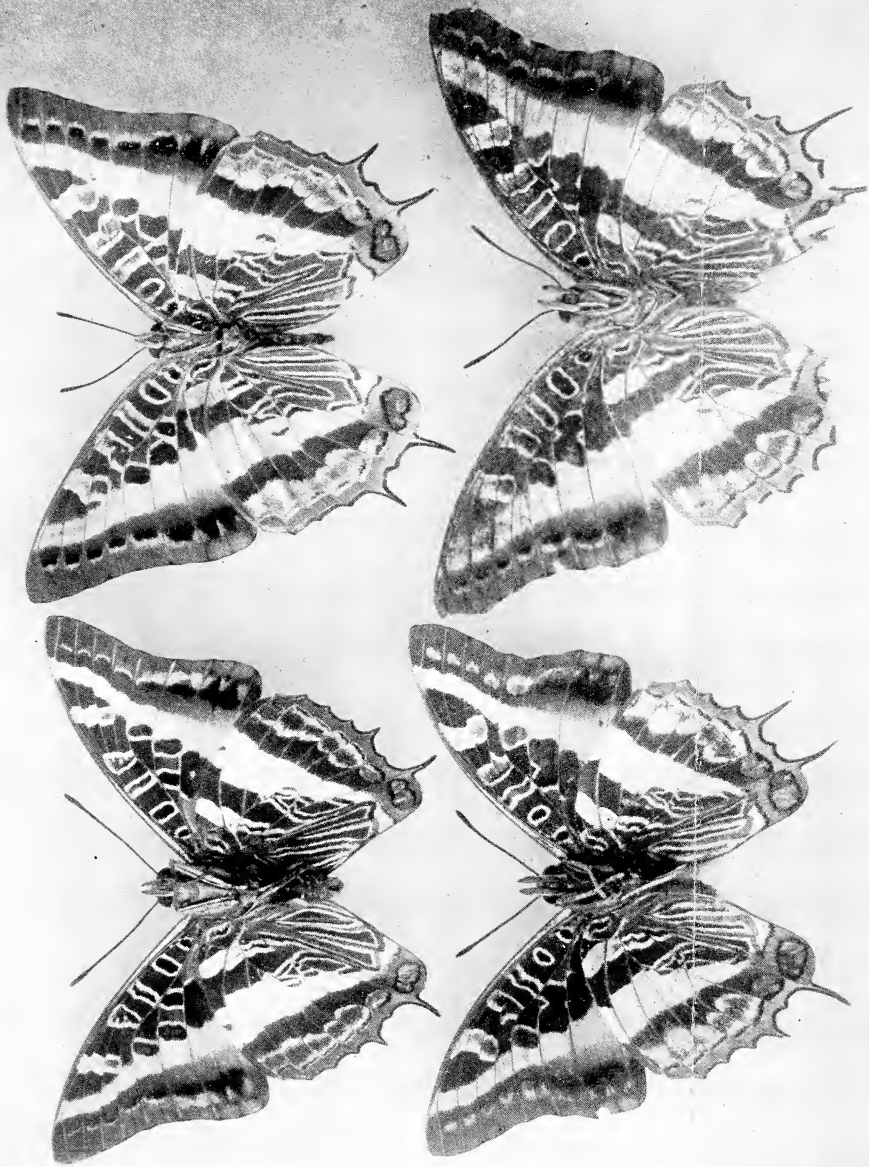


Plate 5. Undersurfaces.
 Figs. 1 & 2. *Charaxes druceanus proximans*. J. & T. (Male and female, undersurfaces.)
 Figs 3 & 4. *Charaxes druceanus teita van-S.* (Male and female, undersurfaces.)

PLATE 6.



Figs. 1 & 2. Male, *Charaxes druceanus proximus* var. nov. *lugari*, van-S.
Figs. 3 & 4. Female, *Charaxes druceanus proximus* var. nov. *lugari*, van-S.

borders of fore- and hind-wings are stronger and more defined. On the underside there is the same intensification of colour which gives a bolder pattern than in *proximans*. (Plates 4 and 5; figs. 1 and 2 are typical *proximans*.)

Distribution: The Teita Hills, from Bura, Wandanyi, and Mbololo. October, 1938, and again February, 1939. Paratypes: five.

CHARAXES DRUCEANUS PROXIMANS var. *LUGARI* f. Nov.

Pl. 6, figs. 1-4.

and *CHX. ALICEA*, Stoneham.

I take this opportunity of referring to the specimen of *Charaxes* described by Stoneham as *alicea* (not *alicia*) as mentioned in Jrnl. E.A. & U. No. 55-56, Vol. XII, p. 178, and figured on Pl. 18). I recorded this as a variation of *druceanus*, on a report made by T. H. E. Jackson, after having seen the type. It is true, that in the original description Stoneham stated that it might possibly be a variety, but nevertheless designated it a species. Under letter dated April 30th, 1936, Col. Stoneham writes that he "followed the usual practice of describing it as a species till it had been bred and its affinities proved."

The specimens which are now before me exhibit on the underside such a variation from the normal, carried to the extreme in *alicea*, as would suggest at first sight that we are dealing with distinct species, i.e. distinct from *druceanus*. However, these two examples suggest a transitional stage toward *alicea*, so far as the underside is concerned, in that the pronounced silver bar characteristic of *druceanus* is lacking, the insects therefore have a more extensive chestnut colouration on that surface.

The two specimens, a male and female, bred by R. T. Evans at Lugari, and presented to the Museum, indicate very well indeed those portions of the silver which are more fixed, and perhaps more primitive.

Thus we find that in the fore-wing, the two black transverse spots in area 2 and that in 3, are outlined completely by silver, whilst the "bar" is pale chestnut to orange. In the hind-wing we find that the "bar" is represented by three silver spots in 6-8.

The similarity of colour in these two sexes is very striking.

As regards the upper surface, the male exhibits a reduction in dark markings, even along the border of the fore-wing and less deep chestnut at the bases. The fore-wing "bar" appears to branch into three, from area 4, for the sub-costal black marks are widely separate.

In the female, the most noticeable feature is the reduction in the width of the fore-wing "bar" brought about by the

increase in size of the black marks toward the bases of areas 2 and 3, and by the presence of a conspicuous large double spot in 1b. Furthermore the bases of 5 and 6 are largely black, but the inverted "costal triangle" beyond is not strongly black. The hind-wing sub-marginal blue spots up to 3 are large and conspicuous.

It would seem therefore, that within the Trans-Nzoia district, there is a tendency for two species, *druceanus* (*proximans*) and *eudoxus* (*cabecus*) to appear without the characteristic silver "bars" on the lower surface. That this is not a chance mutation is suggested by the fact that in one family four such specimens as I have described above were reared from eggs laid by a parent of this type; and again, in the case of *cabecus*, a family of nine *amaurus* were reared from eggs of an *amaurus* female. We are compelled, however, to consider both these divergencies from the nominate types to be variations, probably genetical, as the nominotypical forms also occur in the same areas. It remains to be shown whether in a large family of either species, some offspring will show lines, others not.

A BAT NURSERY.

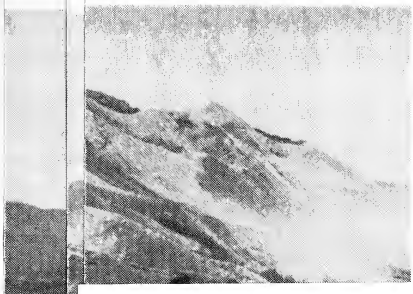
A short while ago I paid a visit with Mr. G. H. E. Hopkins, the Uganda entomologist, to one of the Elgon caves. The object of the expedition was to collect bats of as many different species as possible and to determine the parasites of each. Incidentally they were found to harbour fleas and mites of many different species and several dipterous parasites. In the course of our investigation using an electric torch, we came across a congregation of a small dark coloured bat *Miniopterus natalensis arenarius*, Heller, numbering some hundreds, clustered thickly together over a natural dome in the roof of the cave. They measured about 3 ft. in circumference and completely hid the rock. A stick was thrown up among them scattering the colony and there below clinging to the rock surface was a seething mass of youngsters, pink, naked, and hairless. In a short time the adults returned and covered them again. It would be interesting to hear if this has been observed before.

T. H. E. JACKSON.

PANORAMAS illustrating the
General Narrative, published in
Part 1. Vol. XIV.

A

2
↓



High lava
flow on

CAMP 3
↓
HIGHEST PEAK
↓ 7,200
CAMP 2
↓
CHYULU BEACON 1
↓ 6,800
CAMP 1
↓



THE CHYULU RANGE from MASONGOLENI-NOKA TRACK. Approximate length 35 miles.

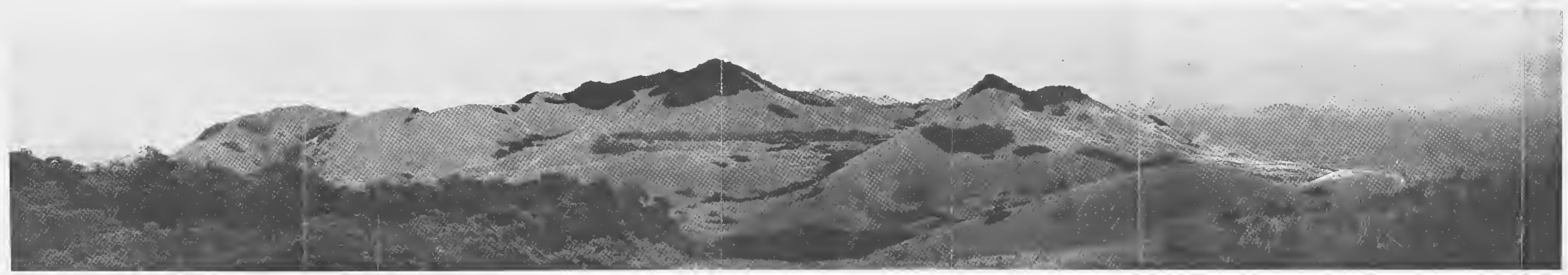
Cedar forest in Crater
↓
Giant Crater & Tree-hill Beacon
↓
Flag hill
↓
Green-hill Beacon
↓



PANORAMA of the NORTHERN END of the RANGE.

High lava flow on 4,500 contour

CHYULU BEACON 1
↓
Little Chyulu
↓
TREE-TOPS
↓
M'BENZAUI, near Kibwezi



MID to NORTHERN PORTION of RANGE. VOLCANIC CONES ENCLOSING HIGH LAVA FLOW, AND SUBSIDIARY CONES.



TREE-TOP HILL. NOTE EROSION GULLIES, and the BUFFALO TRAILS at the base of the HILL.

3

SAMBU, Gneiss hill Masai Plains

5



CEDAR FOREST ON LOWER LAVA FLOW BETWEEN OUT-LYING CONES SEE PICTURE No. 2

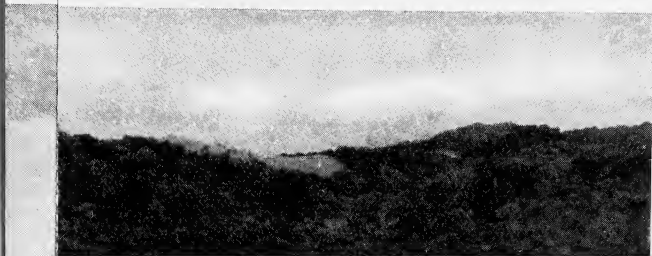
6



HIGH LEVEL LAVA FLOW BETWEEN MAIN RIDGE AND OUT-LYING CONES WITH PATCHES OF COMMENCING FOREST IN HOLLOW.



B



HIGHEST PEAK 7,200

CAMP 2 ↓

CHYULU BEACON 1 ↓

B

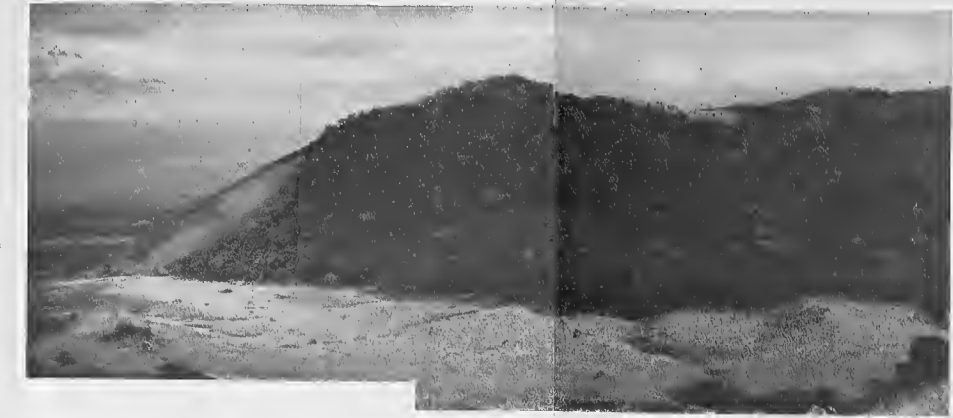


PART of the GREAT CHYULU FOREST.

SOUTH-EAST FLANK of CHYULU RANGE SHOWING EROSION GULLIES. ALL CRATERS ARE ON THE WEST AND HEAVILY FORESTED.

FOREST ON LOW LAVA FLOW, LARGELY OLIVE.

M'BENZA, and the Kibwezi plains.



LINE OF CONTACT between FOREST and LAVA FLOW. THE LAVA HERE IS WITHOUT A COVERING OF LAPELLI AND EXHIBITS NUMEROUS VENTS.



SOUTH CHYULUS WITH CEDAR FOREST.

GREAT LAVA FLOW.

SOUTH-EASTERN ASPECT OF MAIN RANGE. FROM HIGH LAVA TERRACE

HIGH LAVA TERRACE.

PART of the GREAT CHYULU FOREST

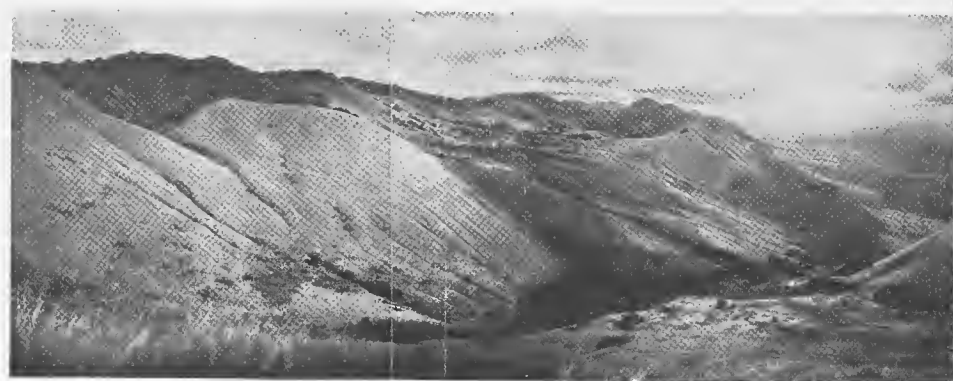
CAMP 2 ↓
CHYULU BEACON 1 ↓
CRATER BEACON ↓
TREE-TOPS ↓



EASTERN FLANK of MAIN RIDGE.

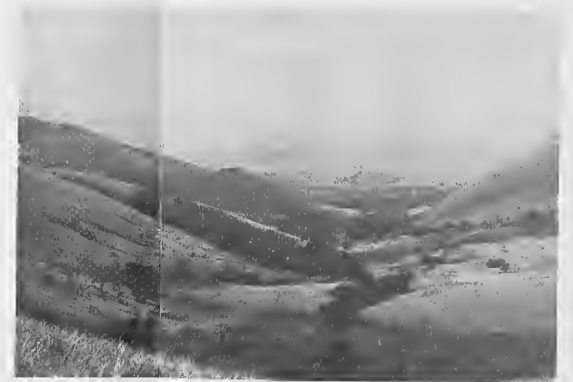
EXTENSIVE HIGH-LEVEL LAVA BED BETWEEN MAIN RIDGE AND OUT-LYING VOLCANIC CONES, WITH FLOW RUNNING S.-E. TOWARD the PLAINS.

5



EASTERN FLANK: SHOWING EROSION GULLIES RUNNING INTO VALLEY FORMED BETWEEN LAVA FLOWS. COMMENCING VALLEY FOREST, COMPOSED LARGELY OF ERYTHRINA.

6



VALLEY FOREST, LARGELY ERYTHRINA, MERGING INTO FORESTS OF LOWER LAVA FLOWS.



C





1 THE SOUTHERN CHYULUS IN RELATION TO NGULEA AND TSAVO RIVER HILLS.



2 PART OF THE EASTERN SIDE OF THE GREAT CHYULU FOREST.



3 EASTERN EDGE OF GREAT CHYULU FOREST. CONFLUENT CRATER AND VALLEY MIST FORESTS.



4 PART OF THE MAIN RIDGE: ON THE RIGHT IS SEEN THE LAST OF THE OUT-LYING EASTERN CONES AND THE DEEPLY SCORED UPPER LAVA FLOW.



5 PANORAMA ACROSS THE GREAT CHYULU FOREST FROM WEST TO EAST, FROM "TREE-TOP BEACON."



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SOME NEW TRYPETIDAE (DIPTERA) FROM KENYA
(CHYULU HILLS)

III.

By H. K. MUNRO.

Among the large series of Trypetidae kindly sent to me for study by Dr. V. G. L. van Someren from time to time, are a number of specimens collected by him in the Chyulu Hills. Several of these represented known species, but there were also some new species and others that must be regarded as varieties of previously described species. The new species and varieties are described here, and the types will ultimately be deposited in the British Museum.

DACUS (DIDACUS) ARCUATUS, n.sp.

A species of the *ciliatus* group having all the yellow markings, except the dorsal stripes, strong, the third segment of the male ciliate and the base of the ovipositor short. It belongs, however, to the series in which the middle femora are entirely ferruginous. It agrees more closely with *ostiofaciens*, Mro., rather less with *tenebricus*, Mro., as shown in the following table:

	<i>Ostiofaciens.</i>	<i>Arcuatus.</i>	<i>Tenebricus.</i>
Upper cross-vein infuscated.	No.	Slightly.	Slightly.
Costal bar.	Complete, narrow and dark, with a apical spot.	As in <i>ostiofaciens.</i>	A dark spot at stigma and apical spot, pale between.
Last section of fourth vein.	Tip distinctly upturned.	The whole forming a gentle arc	Tip just upturned.
Scutellar bristles.	About equal to length of scutellum a part or slightly more, rather more than half width of base of scutellum.	As in <i>ostiofaciens.</i>	About the length of scutellum apart, but only one-third width of its base.

Holotype male, allotype female, 6 ♂♂, 6 ♀♀ paratypes, Chyulu Hills, Kenya, July, 1938, van Someren, reared from fruits of *Pergularia* spp.; 2 ♂♂, 2 ♀♀ paratypes, Mbololo, Kenya, same date and from same plant.

Length: ♂ 6.5 mm., of wing 5.0 mm.; ♀ 7 mm., of wing 4.75 mm. *Head* normal, yellow; occiput brown, the margin below yellow, above with a mere trace of yellow; frons barely one-third width of head, slight black pubescence in middle, the fore half dark brown or reddish, the lateral spots strong, ocellar dot black, bristles black, two inferior, one superior orbital, ocellars microscopic; lunule short, black; antennae brownish, slightly darkened on outside of third joint, first joint short, the other two as long as cheek; face yellow, the black spots large and oval; palpi and proboscis yellow. *Thorax* rather light ferruginous, pubescence pale; there are the usual darker or blackish marks and stripes on the dorsum and the mesopleura and sternites black; yellow marks strong, namely, humeri, moderate mesopleural stripe from suture to sternite, single hypopleural spot and scutellum except base; bristles: no anterior supra-alars and no pre-scutellars, outer scapulars moderate, sometimes weak or absent, or duplicated, the inner not developed, two scutellars; halteres yellow; legs ferruginous, the middle femora wholly so, the front pair paler basally with a blacker spot just past middle, hind pair yellow on basal two-thirds, at end blackish, as also tibiae, tarsi more yellow; wing with narrow black costal margin from stigma including marginal cell, base of sub-marginal as far as, and slightly but distinctly over upper cross-vein, and oval spot on end of third vein, on either side of second vein more yellow, anal stripe strong as also cloud below end of sixth vein in male, the length of the point of anal cell compared to the distance of its tip from the wing margin is about 3:2 in ♂, and 5:4 in ♀, but varies a bit from one specimen to another; the last section of the fourth vein is a gentle curve entirely above a line drawn through the point at the discal cell and the spot where it touches the wing margin—in *ostiofaciens* and *tenebricus* such a line coincides with the vein a little before its end, even if it does not actually go slightly above before the tip. *Abdomen* rather narrowed in specimens, normally probably oval; ferruginous with a paler bar on the hind edge of second segment and a pair of sub-lateral black spots on third segment which is ciliate in male; pubescence pale and short; male genitalia dark; base of ovipositor short, 1.25 mm., flattened, probably normally conical as in *ostiofaciens*.

DACUS (PSILODACUS) INFLATUS, n.sp.

A black species very like *D. macer*, Bez.,* but the latter has the costal margin on the wing stronger and wider, and the upper cross-vein slightly infuscated. The new species also appears to resemble *apostata*, Her., and *ariana*, Her.;† from both it differs in the less acute position of the upper cross-vein and the shorter point of the anal cell; *apostata* has the upper cross-vein infuscated and the only orbital the single inferior, while *ariana* has two inferior and one superior orbital—in *inflatus* there are the two inferior orbitals only.

Holotype male, allotype female and one female paratype, Noka, Kenya, June, 1938, van Someren. Larvae in cucurb No. 4.

Length: ♂ 5.0 mm., ♀ 5.5 mm., wing ♂ 4.75 mm., ♀ 5.25 mm. *Head*: proportions of length, height and width, 7:9:11; occiput shining black, yellow below but no yellow edge on upper part of orbits, brownish above neck and a yellow spot behind vertex; frons somewhat concave in specimens, twice as long as wide and about one fourth width of head, yellow, shining black over vertex including ocellar dot, but on each side of latter is a brownish dot, across middle of frons a strong brown bar one-sixth its length and connected to ocellar dot by a narrow median stripe leaving thus a pair of large, rounded, yellow spots on upper part of frons, the upper inferior orbital close to front edge of brown bar, the lower at base of antennae, each on a brown dot, superior orbitals absent, the ocellars minute, hair-like, slight black pubescence on anterior middle, some pale on sides; lunule black; antennae black, as long as cheek, the first joint short, arista brown at base, bare; face, narrow cheeks and genae yellow; palpi and proboscis yellowish. *Thorax* shining black, very lightly grey-dusted, except on anterior edge, the dust further forming a more distinct pair of rather wide, median stripes, narrow anteriorly and separated by a black streak, there is moderate, short, pale pubescence on dorsum, but no yellow post-sutural stripes; yellow are: humeri, a large mesopleural area touching the sternite below but not, except a trace in one specimen, on to the notopleural callus, and a single, large hypopleural spot; the propleura and the fore, lower corner of mesopleura more ferruginous and set with short, appressed white pubescence, which on yellow areas is yellow; scutellum yellow with slight yellow pubescence, the base narrowly black; bristles black, no anterior supra-alars nor pre-scutellars, only outer scapulars, two scutellars, a notopleural,

* Bezzi, *Bull. Ent. Res.*, VIII, 180, fig. 3, 1917.

† Hering, *Mitt. Zool. Mus. Berlin*, 22, 257, 258, 1937.

mesopleural and a very weak or no pteropleural. Legs and halteres yellow. *Wing*: the proportions of the length of the stigma, the distances between first and second, and second and third veins on costa are, in both sexes, 7, 5, and 10; the upper cross-vein is markedly perpendicular, being at right angles to the second vein and almost so to the third; the inner part of first posterior cell widened much as is seen in *macer*, but perhaps rather more so; point of anal cell acuminate, narrow, rather wider in male, three-fifths length of rest of sixth vein to wing margin in both sexes; stigma black, the marginal cell barely infuscated, the submarginal not at all except at end where the isolated, more or less oval, apical spot extends from about midway between ends of second and third to as far between ends of third and fourth; upper cross-vein not infuscated. *Abdomen* rugose, shining black, with moderate whitish pubescence; the apical segment yellow in middle and at end, but the rounded depressed areas black; sternites black; genitalia yellow; base of ovipositor short, 1 mm., flattened in specimens, light ferruginous, with pale, brownish pubescence.

PARDALASPIS CUTHBERTSONI, Mro.
var. *NIGROTERTIUS*, var. nov.

It seems best to regard the specimens recorded here as representing a blacker, and slightly larger and more robust form of *cuthbertsoni*; the variety differs most markedly in the coloration of the abdomen.

Holotype male, allotype female, 5 male and 6 female paratypes, Chyulu Hills, Kenya, 6,000 feet, June, 1938, van Someren. Larvae in fruits of *Conopharyngia*.

Length: ♂ 8.0 mm., of wing 7.0 mm., ♀ 12.0 mm., of wing 8.0 mm. *Head*: in both sexes as in *cuthbertsoni*, but upper middle part of occiput black, and upper part of frons with blacker tinge. *Thorax*: dorsum black, moderate whitish dust, pubescence before suture short and yellowish, behind longer and black; humeri and pleura light blackish-brown, upper half of mesopleura yellow, the contrast much more strongly marked than in *cuthbertsoni*; pubescence rather long, pale yellow, black along top of mesopleura. *Abdomen*: in *cuthbertsoni* more reddish brown, with fairly large, separated or more or less indistinctly united spots. In the variety it is more completely black, or brownish black, in particular the third tergite, only the base, first segment, brownish, rather densely covered with brown dust and pale yellow pubescence; the second segment is black with thick blue-grey dust, only perhaps slightly paler in middle where dust is brown, the pubescence black only pale on

centre of anterior edge; third segment brownish-black only hind edge and lateral margins narrowly grey-dusted and a trace of brown dust on middle, pubescence black (the coloration of this tergite is the special difference from *cuthbertsoni*); 4th segment black, the posterior two-thirds thickly grey-dusted, leaving a brownish-black bar, broken in middle, on anterior edge, on the middle of each side is a conjoined spot and the inner, convex margin of the brownish-black is broadly margined posteriorly with white dust and white pubescence, which is otherwise black; fifth segment has a broad spot on each side separated by a yellowish spot on centre and bordered behind by whiter dust and white pubescence but not as marked as on fourth segment, apex of segment more or less reddish, pubescence black. In one male the hind third of third segment is widely grey-dusted and the black almost broken up into broad spots, and on the fourth the anterior brownish-black bar is broken up into four spots, the appearance thus approaching that seen in *cuthbertsoni*. In the female the abdomen is almost entirely black, the markings are obscure but much as in the male; there is thick grey dust almost all over and the pubescence black except on first segment and the hind edges of the pair of sub-median black spots on the fourth segment; the second segment shows an indistinct brownish spot towards each side; the third is more strongly brown with less dust; on the fourth the median pair of spots is more distinct, the anterior brown edge less marked laterally and a pair of barely marked brown spots towards the sides; fifth segment with indistinctly brown fore edge and pair of dorso-central spots; sixth very short and blackish, the apical bristles strong. Male genitalia reddish. Base of ovipositor 4.0 mm., flattened in specimens, blackish ferruginous on basal half, black outwardly, pubescence black. Wing as in *cuthbertsoni*, but in female the medial band rather stronger.

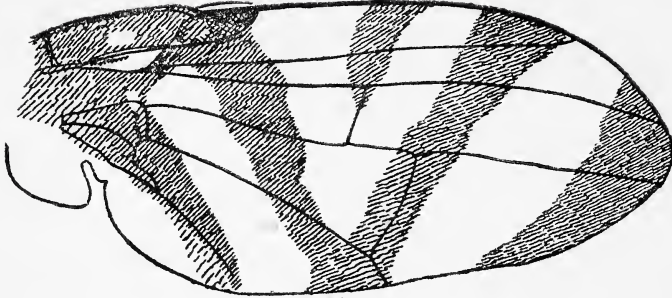
TYLASPIS QUINOTATA, n.sp.

A brown species; differs from the others with bilobed scutellum (*maraisi*, Mro., and *russa*, Mro.) in the wing-pattern which is characterised by a simple, conspicuous V-shaped figure.

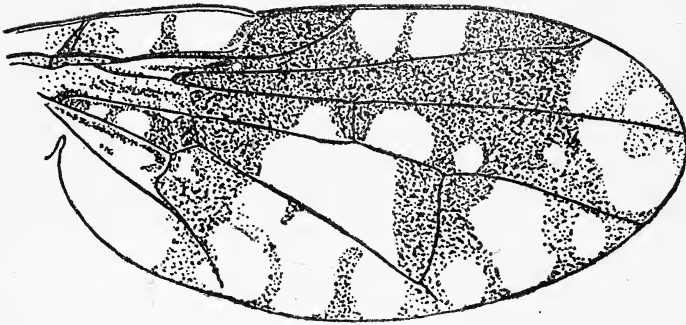
Holotype ♂, Chyulu Hills, Kenya, April, 1938, alt. 3,500 feet, Coryndon Museum Expedition.

Length 5.0 mm., of wing 5.2 mm. *Head*: proportions of length, height, and width, 2:3:4 (the length is rather more than half width); occiput concave above, moderate below with pale yellow pubescence; bristles yellowish with black setulae between; frons prominent before eye, the fronto-facial angle marked, width about two-fifths greater than length; slight yellow pubescence before lunule; reddish-brown but light

FIG. I.



Tylaspis quinotata sp. nov.



Baryglossa tersa sp. nov.

brown broadly round dark ocellar dot, on vertical plates and on sides in front; inner and outer vertical bristles, the two superior orbitals abraded; ocellars very small, brown, three inferior orbitals black; lunule large, about one-third length of frons, light brown, whitish in middle and a little black pubescence on sides; antennae about three-fourths length of face, third joint narrowed outwardly, the apex rounded, first and second joints with black setulae, arista short pubescent; face flat, the epistome somewhat broadly prominent, with black pubescence on sides; cheeks about two-thirds width of third antennal joint, genae a quarter height of eye, a rather indistinct, sub-ocular spot reddish brown, the black bristle strong; mouth opening large; eye of moderate size, microscopically pubescent. *Thorax* yellowish-brown, densely dusted; on dorsum a pair of wide, dark brown stripes on dorso-central line; pubescence mostly abraded but apparently pale yellowish; bristles normal, black, on darker brown to black spots, dorso-centrals half-way between anterior supra-alars and suture, two mesopleurals, the lower weaker, pteropleural and sternopleural present, four scutellars; scutellum flat above, the basal bristles on small black spots, the apicals on large, shining black spots, the apex moderately bilobed; squamae pale yellow, of moderate size, ear-like; legs light brown with black clothing except yellowish on front femora and basally on middle pair; coxae with usual bristles strong (one also on sternite before each middle coxa), front femora slightly swollen and with row of black bristles; halteres yellow; wing (fig. 1) stigma short, one strong costal bristle about as long as stigma present and another apparently of same size broken off, third vein with one or two setulae at base; pattern yellowish-brown, base and stigma darker as also costa where touched by bars. *Abdomen* yellowish-brown, pubescence on segments one and two, and on hind edge of third yellowish, black elsewhere as well as on sides of second segment, apical bristles on last segment strong; venter pale brown, pubescence yellowish, black on last sternite; genitalia brownish.

SPHENISCOMYIA NEAVEI, Bez.,
var. *CHYULUENSIS* var. nov.

Very like *S. neavei*, Bez.* but with an additional hyaline spot at the outer end of the discal cell.

Holotype ♀, Chyulu Hills, alt. 5,600 feet, June, 1938, Coryndon Museum Expedition.

The specimen agrees with the description of *S. neavei*; length 3.0 mm., of wing 2.5 mm. It may be noted that there

* Bezzi, 1920, *Bull. Ent. Res.*, X, 257, Pl. xviii, fig. 6.

are two superior orbitals; the squamae pale, the halteres darker, yellow; the black abdomen is faintly grey-dusted or etched except the last tergite, which like the base of the ovipositor, is polished as in *neavei* also; further, in the latter, only the hind edge of the fifth tergite in the male is polished. The sixth tergite is three-fourths the length of the fifth.

The wing-pattern is similar to that of *neavei*, differing in the following points: the outer hyaline indentation the costa does not quite reach the third vein; there is an additional fair-sized hyaline spot in the discal cell touching the vein just below the upper cross-vein. There are one or two setulae at the base of the third vein and three or four over the first posterior cell; this is like what is found in a female of *neavei* that I have, but in a male there appear to be only one or two very minute setulae over the first posterior cell. In any case the setulae are extremely difficult to observe.

METASPHENISCA BEZZIANA (End.)

Enderlein, 1911, *Zool. Jahrb.*, 31, 424, fig. F. *Trypeta*.
Bezzi, 1918, *Bull. Ent. Res.*, 9, 22; 1924, *id.* 15, 125. *Tephrella latincisa*, Bezzi, 1924, *Bull. Ent. Res.*, 15, 123; Munro, 1935, *Ann. Mus. Nat. Hung.*, 29, 14. Fig. 8—wing ♀. *Aciura*.

This is a very striking species that may be included in *Metasphenisca* on account of the shape of the lunule. Having examined Bezzi's type and another female sent to me by Dr. van Someren (Chyulu Hills, alt. 6,000 feet, June, 1938, Coryndon Museum Expedition) there is no doubt that Bezzi's species is the same as that of Enderlein.

There seem to be normally two superior orbital bristles, but in the Chyulu Hills specimen the upper on one side is absent (apparently not abraded), the other small. In Bezzi's type the antennae are broken off; it may be noted now that the third joint is somewhat narrowed outwardly, the upper edge straight, the arista short pubescent.

BARYGLOSSA TERSA, n.sp.

Differs from *B. histrio*, Bez., in the absence of stripes on the rather light brownish-yellow dorsum of thorax. *B. bequaerti*, Bez., also has the thorax unstriped, but it has a very different wing-pattern.

Holotype ♂, allotype ♀ and a pair of paratypes, Kibwezi, Kenya, June, 1938, van Someren (Chyulu Hills, Coryndon Museum Expedition; alt. 3,000 feet). Bred from flowers of a cucurbitous plant.

Length ♂ 4.4 mm., ♀ 5.0 mm.; of wing ♂ 4.0 mm., ♀ 4.2 mm. *Head* yellow, only ocellar dot black and lower part of cheeks and sides of epistome brown; proportions of length, height and width, 7:8:11, rather square in profile; occiput flat above moderate below, the bristles thin and black; frons flat, strongly projecting before eye, the fronto-facial angle a little less than a right angle, as long as wide and not quite half width of head, bristles black, rather long and thin, two superior orbitals, two lower as a rule, but in male type there are three, ocellars long; lunule linear, inconspicuous; antennae about as long as short face, third joint large, rounded-oval, arista brown, bare; face short with strong median keel on each side of which strongly concave, the epistome projecting moderately; cheeks very narrow in their middle portion, genae narrow; eye large; palpi large, the narrower, darker, basal part jointed to apical half which is leaf-like and oval, yellow in colour, normally the palpi seem to be carried well forward, pressed against the inner part of the epistome and projecting beyond it; proboscis yellow, massive, stumpy. *Thorax*: dorsum light brownish-yellow, pleura paler becoming yellow on sternites; dorsal pubescence blackish, pleural yellow; no stripes on dorsum only lower part of humerus, a narrow, indistinct notopleural stripe, end of scutellum between apical bristles and post-scutellum brown or brownish to blackish; bristles complete, black, thin; inner and outer (sometimes duplicated) scapulars thin, two humeral, the upper smaller, three mesopleurals, the third smaller and in front of the usual upper one, dorso-centrals on line of outer posterior supra-alar (it may be noted that on the dorso-central line a few hairs among the rather long pubescence are developed almost bristle-like), pteropleural and sternopleural moderate. Scutellum short, moderately convex, with black pubescence and six bristles, the middle pair about half the length of the others; upper squama dark with blackish rim, lower yellowish, almost linear. Legs pale yellow with yellow clothing, but the row of bristles on fore femora and some of the stronger hairs on the hind, brown. Halteres yellow. Wing (fig. 2); the pattern is a more reduced reticulation than that shown in Bezzi's figure for *B. histrio* although basically similar; the middle part of the discal cell and most of the third posterior is hyaline, and the apical fork not well-marked; no costal bristle; third vein strongly setulose almost to its tip. *Abdomen* coloured as dorsum of thorax, shining, and with black marks as follows: on third tergite on each side an oval, sub-lateral spot, on the fourth the lateral third a broad tongue extending inwards on the anterior portion of the segment, thus leaving a somewhat pandurate, yellow area on the middle, the fifth mostly black, only a narrow, pestle-shaped area in middle. There is thus a com-

plete yellow median stripe, not present in *histrio*. In the female the lateral black marks on the fourth segment leave a narrow yellow margin on the anterior edge, but the marks are somewhat variable in extent, the very short sixth segment is only slightly yellowish in the middle of the fore edge. Venter and membranes yellowish. Male genitalia shining black, with long hairs. Base of ovipositor 1.0 mm., shining black with black pubescence, conical, rather flattened basally.

TRYPETA PERINGUEYI (Bez.)

Bezzi, 1924, *Ann. S.A. Mus.*, 19, 488, Pl. xiii, fig. 37, ♀; *Bull. Ent. Res.* 15, 111 (*Phorellia*).

Munro, 1925, *Union S. Afr. Dept. Agric., Ent. Memoirs* 3, 51; 1929, *id.* 6, 13 (*Phorellia*); 1935, *id.* 9, 48 (*Trypeta*).

The type is a damaged female from the Cape Peninsula in the South African Museum, Capetown; I have a good female paratype from East London. The species appears to extend from the Cape Peninsula, round the southern coastal area, then northwards through Natal and on to Kenya, where Dr. van Someren has bred it in numbers.

The male has not previously been recorded. It differs from the female in being generally smaller and the wing with a yellow, diffused pattern. Instead of the broadly M-shaped pattern formed of fairly well-defined bars, the latter become broadly connected longitudinally, so that the wing is almost entirely yellow with a few hyaline spots. Thus, the fore part of the wing is broadly yellow with only a small hyaline spot about the middle of the sub-marginal cell; the first basal cell is largely hyaline in the middle and the first posterior has a large spot at its base and one, less marked, outwardly; the discal cell is yellow; the second basal also yellow but broadly pale yellowish outwardly; the third posterior pale yellowish towards the end of the sixth vein. In some males the bars are more distinct as they are blacker and there are more extensive hyaline areas in the marginal, sub-marginal and discal cells, but there is always some longitudinal connection between the bars, especially in the discal cell.

The abdomen in both sexes is banded black and yellow, the anterior halves of the segments black, where they are also to some extent yellowish on the middle line.

Males seem to be generally less numerous than females. I have only seen one male from South Africa, a specimen collected in the Katberg, Cape Province, October, 1932, by Mr. R. E. Turner; this is in the British Museum collection. Several males were found in the material reared by Dr. van Someren in Kenya.

NEW *PSYCHODA* FROM KENYA COLONY (CHYULU HILLS).

By A. L. TONNOIR

(Senior Research Officer, Canberra, Australia).

PSYCHODA LATISTERNATA sp.n.

A small, uniformly brownish species belonging to the group of *Ps. amphorica*, Tonn., *bilobata*, Tonn., and *albida*, Tonn., in which the antennal segments 14 and 15 are united.

MALE: Eye bridges closely approximate, the distance between them equal to the width of one facet. Antennae 16 segmented, the bulb of the 3rd segment (fig. 1) a little longer than that of the 4th and more or less amphora-shaped, median segment (fig. 2) with moderately elongate neck; the 14th and 15th united, the 16th ovoid, distinctly smaller (fig. 3). Ascoids long Y shaped, present in pairs on segments 3 to 13, a sensory pore on each side of their base (fig. 2).

Palpi with first three segments subequal to each other, the fourth just a little longer, scarcely thinner.

Labial lobe as in fig. 4, with three terminal elongate cones and a small one; two lateral bristles.

Wing (fig. 5) rather broad, nearly half as broad as long; origin of stem of anterior fork placed on apex of basal cell, posterior fork exactly midway between this apex and the anterior fork.

Hypopygium: ninth sternite relatively broad; coxites only half as long again as broad, rounded on the outside but not bulging, styles only a little longer, wedge-shaped but with apex curved inwards and carrying conspicuous sensory setae; aedeagus symmetrical, apparently formed of two identical pieces which may actually be fused up to their tip (fig. 6). Cercopod longer by one half than the 9th tergite, its basal half incrassate but not really bulbous; retinacula long and thin (fig. 7), pointing towards each other; pseudo spiracles of 9th tergite fused into one single opening; internal lobes (fig. 8) small and pubescent.

Wing length: 2.19 mm.

Holotype: Chyulu Hills, Kenya, April, 1938, V. G. L. van Someren.

This species differs from *Ps. undulata*, Tonn., *amphorica*, Tonn., *bilobata*, Tonn., and *albida*, Tonn., to which group it

belongs on account of the structure of the last few antennal segments, by the absence of any trace of distal neck on segment 13 and by the structure of the genitalia which lack the large divergent parameres and also by the relatively broad 9th sternite.

PSYCHODA ALBIDONIGRA, sp.n.

A black and white species with fourteen segmented antennae, belonging to the group of *Ps. acuta*, Tonn., and *latipennis*, Tonn., on account of the conformation of the last two antennal segments.

Covering of body and wing ochraceous white; that of the head, base of antennae and legs brownish black, anterior legs darker; small black tuft on the base of costa blackish, contrasting with the rest of the pale vestiture of the wing.

FEMALE: Eye bridges separated by a distance equal to two facets. Antennae 14 segmented, third segment scarcely longer than the fourth (fig. 9), no suture between segments 13 and 14 (fig. 10), the latter very small, spherical. Ascoids Y-shaped, present in pairs on segments 3 to 13.

Palpi with first three segments subequal to each other, the fourth only a little longer, not much thinner.

Labial lobes (fig. 11) with three long cones and two small ones between them; two long lateral setae.

Wing fairly narrow, not quite three times as long as wide; venation exactly as in *Ps. latisternata* (fig. 5), the second costal callus also present and just as large.

Subgenital plate as in fig. 12, the distal lobes divergent; the internal sensory organ long and curved, two fairly large internal lobes at its base; ovipositor normal.

Wing length: 1.9 mm.

Holotype (on slide): Chyulu Hills, Kenya, VI—1938, V. G. L. van Someren.

Paratype: one ♀, same locality and date.

On account of its peculiar colouration, which, strange to say, comes very near to that of an as yet undescribed species from New Zealand, *Ps. albidonigra* cannot be confused with any of the Ethiopian species. It has some affinities with two of them, *Ps. acuta*, Tonn., and *latipennis*, Tonn., the antennae of which being also 14 segmented and the last segment very small, spherical and united to the 13th. This structure of the antennal tip is found in other as yet undescribed Ethiopian species and will probably be found to be a common feature among the species of *Psychoda* of that region.

The large internal lobes of the subgenital plate are quite a unique feature. It is probable that they may remain attached to the base of the ovipositor when the dissection is not very carefully done.

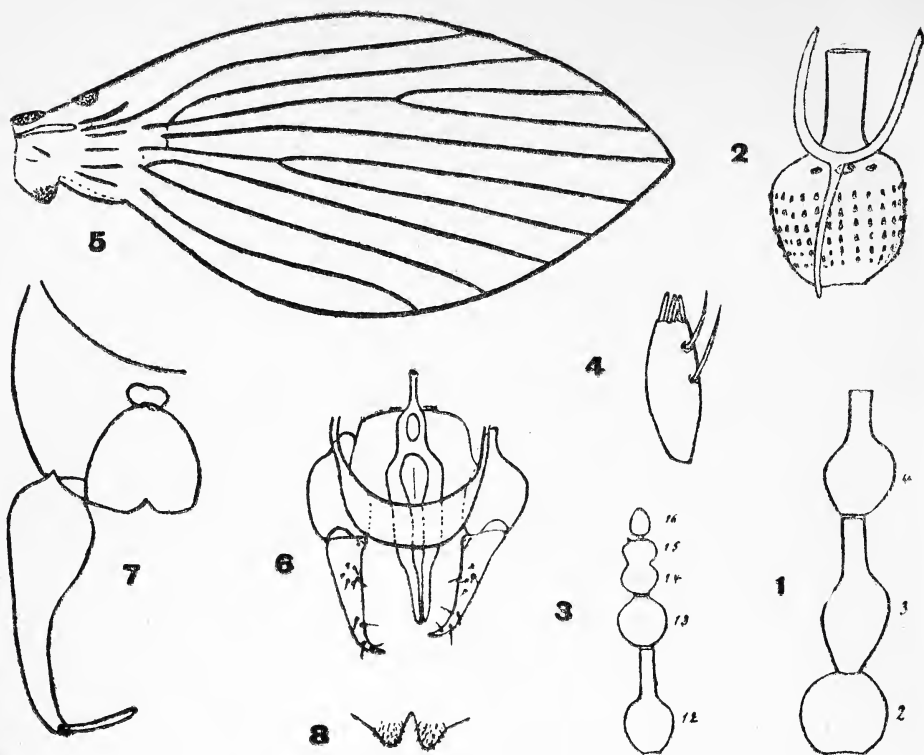
LEGENDS.

Figs. 1 to 8 *Psychoda latisternata* sp.n. male: 1 base of antenna, 2 median segment, 3 tip of antenna (same scale as 1), 4 labial lobe, 5 wing denuded, 6 upper part of hypopygium, 7 lower part, same scale, 8 internal lobes, larger scale.

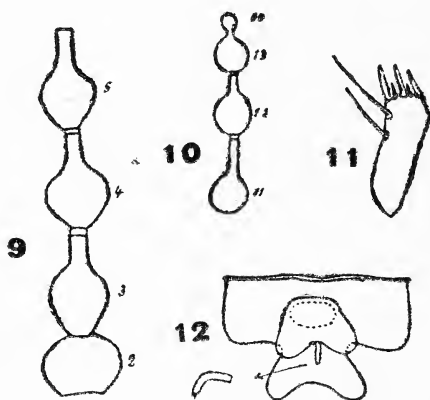
Figs. 9 to 12 *Psychoda albidonigra* sp.n. female: 9 base of antenna, 10 tip of antenna, same scale; 11 labial lobe, 12 subgenital plate seen from below, on the side profile of internal organ.

REFERENCE.

A. L. Tonnoir: Ruwenzori Expedition, 1934-35, Vol. 1, No. 4, 1939. *Psychodidae*, pp. 33-80, 156 figs., 2 pl.

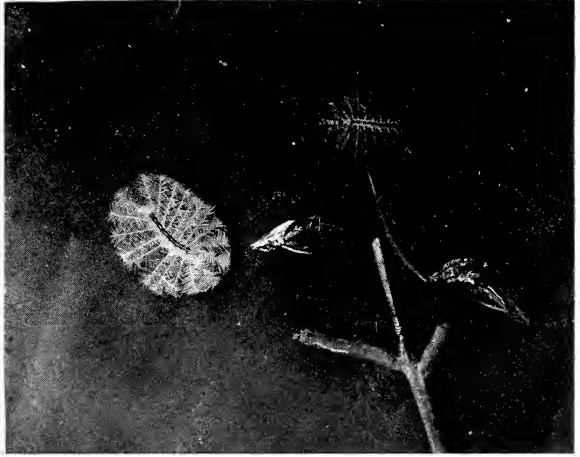


Psychoda latisternata sp. nov.



Psychoda albidonigra sp. nov.

PLATE A



Larvae, pupae and egg of *Aterica galene*.

PLATE B



Larvae and pupae of *Aterica gatlene*.

PLATE C



Larvae and pupae of *Diestogyna ribensis*.

THE BUTTERFLIES OF KENYA AND UGANDA.

Vol. II. Part 2.

Family NYMPHALIDAE.
Sub-family Nymphalinae.
(continued)

By V. G. L. VAN SOMEREN, F.R.E.S., F.L.S., etc.,

With Introduction and Notes by T. H. E. JACKSON, F.R.E.S.

INTRODUCTION.

The Nymphalinae comprise the following genera: *Euphaedra* (already dealt with), *Cymothoe*, *Euryphura*, *Diestogyna*, *Euryphene*, *Euptera*, *Hamanumida*, *Cyandra*, *Pseudathyma*, and *Aterica*, all of which are dealt with in this paper; a few which do not occur within the boundaries of Kenya and Uganda, such as *Hamilla* and *Craenidomimas*; and a further four which will be the subject of a future paper: *Catuna*, *Pseudoneptis*, *Pseudargynis*, and *Pseudacraea*.

They are all purely African Genera, no examples occurring anywhere but on this continent.

The systematics of the nine genera included in this paper are very confusing. An attempt was made recently at the British Museum (Nat. Hist.) to isolate the various species by dissection and examination of the male genitalia. Unexpected difficulties arose, many well-known and distinct species appeared identical in this respect and the attempt was finally abandoned. It should be stated that the dissections were all made by the "dry method," i.e. slides were prepared and afterwards examined. It would seem, however, that a more satisfactory method known as the "wet preparation," as advocated by Brig.-General Evans, in his recent Monograph of the African Hesperidae, might bring to light points of specific distinction, otherwise obscured. Failure to differentiate the species by means of genital examination does not therefore imply that the classification of the species in the British Museum is incorrect.

It is significant that in all Uganda forests, very few species of any one genus occur, although individuals of each species may differ markedly in external facies, especially in colouration, from those occurring in neighbouring forests.

From such evidence as is available, it would appear probable that we are in reality dealing with comparatively few species in each genus with so many isolated races, each confined to its particular forest.

Factors which have probably given rise to this apparent differentiation into racial forms are: (a) that, with very few exceptions such as *Hamanumida*, all are forest species; (b) that they are restricted to a certain type of habitat, avoiding open spaces, and keeping to dense cover; (c) that because of their restricted environment interbreeding must result in an intensification and eventual stabilisation of certain characters which have arisen as a mutation or variation from the normal, and in the course of association with other species, have proved beneficial.

A species confined to one small area defined by the boundaries of its own particular forest, from which it is prevented from straying by an inherent dislike of open spaces, is an ideal subject for the action of natural selection and may therefore be expected to produce different forms in different localities.

The habitats of this group of genera are unique: as stated above, all, with one exception, are forest species, dense forest being preferred to more open growth. The flight is swift and erratic and seldom more than a few feet above the undergrowth.

Whereas most of the *Rhopalocera* require strong sunlight to stimulate flight, the species of this group, owing to the dense forest conditions in which they live, are comparatively unaffected by light and may be seen flying or feeding in dull weather and quite late in the afternoon. It is nevertheless a fact that males will choose a patch of sunlight in which to bask, and if disturbed will return to the same place. Advantage may be taken of this habit, for the best method of capturing them is to stand as motionless as possible over some sunny patch from which a butterfly has been disturbed, until it returns. The power of vision is unusually well developed, the slightest movement being observed, but motionless objects are not distinguished. It is almost impossible to stalk a member of this group—invariably the insect is scared away before it can be caught, but if one stands quite still and a second collector circles around behind and then walks toward one, the insect will often fly straight to the net.

All the members of this group feed on fermenting fruits and many, in both sexes, may be attracted to banana bait. A forest may appear to be quite untenanted away from the clearings, until one comes across a fig tree with fallen fruit lying below, and then hundreds of these butterflies will be found feeding thereon. The females, otherwise scarce, being occasionally seen flying about the undergrowth in search of the food-plant, are equally attracted to this type of food.

The colours of the males, and in many cases both sexes, are startlingly brilliant as the wings are opened for a second in a

shaft of sunlight, only to be closed again on the slightest movement near at hand. The underside patterns are strongly pro-cryptic and the dazzling effect of the uppersides followed instantaneously by a "black-out" must form a very efficient protection against predators such as birds.

The mimetic associations of the group are interesting. In the males there is much Müllerian mimicry, instances of which are recorded in the text after each species. The *Diestogyna* form a group to themselves; most of the species being black or dark brown with blue and purple reflections which in other parts of tropical Africa is closely mimicked by males of certain *Euryphene*. In the latter genus is a group centred round *E. absolom entebbiae*, Lthy., comprising five species in Uganda, all of which are brown with dark transverse bars, and practically indistinguishable above.

In the *Euphaedra*, a large and powerful species, *E. spatiosa*, is mimicked by the female of *E. medon fraudata* and the male of *E. paradoxa*. Incidentally also to this group belong the females of *Charaxes tiridates*, *numenes*, *bipunctatus*, and the *cedreatis* form of *etheocles* (s.l.).

In the females, practically every species belongs to one or another group, the most notable being the female of certain *Diestogyna* and *Euryphene* which mimic *Catuna crithea*, a very common species, concerning which there is some evidence to support the view that it is distasteful—it has a slow deliberate flight close to the ground and makes no attempt to escape—the exact opposite to its mimics. It is closely mimicked by the females of *D. ribensis*, Ward, *obsoleta*, Grunb., *goniogramma*, Karsch., *saphirina*, Karsch., *Eu. absolom entebbiae*, Lathy., *carshena*, Hew., and *Cyandra opis*, Dr. It is suggested that this is a true Batesian mimicry with *Catuna*, and much Müllerian mimicry amongst themselves, though it is of course not always possible to draw a line between the two types of mimicry.

The larvae and pupae of the group are highly pro-cryptic; the former are furnished with a fringe of long spiny filaments carried laterally, which lie out flat on either side of the body. The larva rests along the mid-rib of a leaf with its feathery filaments flattened against the surface and corresponding to the veins of the leaf. They are thus extraordinarily difficult to see. The pupae are beautiful objects, adorned with spines, spots, and colours, and are of such irregular shapes as can be seen in any curled up leaf.

T.H.E.J.

In preparing this paper, I have had the valuable assistance of Mr. T. H. E. Jackson, who has made available to me many species not previously recorded from Uganda. In the case of types of new races or forms, arrangements have been made that those described from Mr. Jackson's material will be deposited in the British Museum, Natural History; other types will be found in the Coryndon Museum, Nairobi.

I should like to place on record my grateful thanks to Mr. G. Talbot, of the British Museum, whose help in, and knowledge of, this very difficult group have proved invaluable.

Much still remains to be done, particularly with regard to the early life-history of the species recorded; their seasonal variation, geographical distribution, and mimetic associations. Owing to their retiring habits and the very brief glimpses one obtains of many of the group, little or nothing is known of their food plants, eggs, and larvae.

V. G. L. VAN SOMEREN.

NYMPHALIDAE (Continued).

HAMANUMIDA DAEDALUS, F. Pl. I, figs. 1—6.

Expanse 25-35 mm. Sexes very similar. General colour brownish slate-grey.

MALE AND FEMALE: F.-w. ground colour brownish-slate-grey, tending to become more brownish with wear. Apex often with a white tip; cell with two subcostal white dots outlined in black with black and white lines from each to hind edge of cell; apex of cell with an incomplete figure 8 mark in black and white. Extreme edge of wing with white spots at veins, followed by a submarginal row of white dots, often triangular in shape, outlined proximally with black; running parallel and internal to this is a further row of white spots, double in 1b, circular in shape and outlined in black; between this and the cell is another row outlined proximally with black, double in 1b, the spots in 5 and 6 inclined toward costa.

H.-w. ground colour as fore-wing; cell with one or two black irregular shaped rings; the disc of the wing with three rows of white spots continuous with those of the fore-wing, the veins between the submarginal and next row often black and connecting these spots.

Undersurface: Variable; ground colour greyish-tawny to orange-tawny, the marks and spots of above may be only slightly reproduced below, with a whitening of the posterior angle, or they may be very conspicuously white or bluish-white with the spot in the sub-base of the hind-cell well marked.

The form with well marked white spots below has been named f. *meleagris*, Cr.

EARLY STAGES: The eggs are laid on various species of *Combretum* either on the upper or lower surfaces of the younger leaves. They are hemispherical, faceted and strongly spined, creamy to pale green in colour. Egg stage five to ten days. Larva very similar to those of *Euphaedra*, possessing lateral feathery spines from the second to penultimate segments; general colour dull green. The larvae rest on the mid-rib of the leaves and are thus difficult to detect. One finds them more often on the young shoots of trees that have been cut. In the first instar the young larva is olive with hardly any indication of lateral processes. As the larva matures it becomes more translucent. The pupa is greenish very euphaedra-like but with less prominent tubercles on the dorsum and wing angles. Many are devoid of golden or silvery bases to the tubercles. Pupal stage averages one month.

DISTRIBUTION: The species is distributed throughout Kenya from the coast to the highlands up to 10,000 feet and is also plentiful in Uganda. It is not a forest insect but occurs in the open grass country where there are scattered trees and their food plant. Such suitable localities are often found between forest patches where the grass is not tall and rank; indeed the insect is very often associated with almost bare areas where they are found sitting with wings outspread on rocks and bare ground. The colouration is highly cryptic. The flight is swift and gliding. One finds them most active in the late afternoon just as the sun is well on the slant. Their movements are rapid and because of their colour, very elusive. They, however, never fly very far and can be captured if pursued.

ATERICA GALENE, Brown. Pl. 2, figs. 1-4. Pl. 3, figs. 1-2.

Expanse: Males 24-32 mm.; females 33-40 mm. Sexes unlike.

Range: Uganda to Elgon and Nandi.

MALE: F.-w.: Ground colour velvety black at base inclining to black-brown distally; light spots yellowish-white in a curved row from sub-costal in the cell, increasing in size to cellule 2; cell often with two or three bluish wavy transverse lines; a sub-apical series of spots double in four as parallel streaks, very small in 5 and larger sub-costally in 6; very often the spot in 5 is absent; apex finely white tipped; margin white between veins.

H.-w. brown-black paler toward costa and inner margin; a large yellowish-white patch narrowest toward inner margin and widening out toward the mid points in cellules 5-7, distal and

hind margin of this patch serrated. Many examples have a series of black submarginal lines faintly outlined with whitish and the extreme edge is white internervularly.

Under surface: Ground colour of fore-wing blackish paling toward the posterior edge, tip olive-ochreous with a brownish suffused patch just below apex; light spots of above present below. H.-w. ground colour olive-ochreous with diffuse darker olive bars distal to the patch of above which is less distinct; cell with a strongly marked velvety-black bar, sub-basally.

FEMALE: F.-w. ground colour black-brown, spots as in the male but white and larger, the cell marks more pronounced and with a clear white line proximal to the apical cell spot sometimes carried up to the costa. H.-w. black-brown at base and outer side, shading to brownish at anal area with black rays widening out at margin and meeting a wavy blackish submarginal row of lines often accentuated with slight white lines; extreme edge white lined at veins, markedly so opposite 7-8; h.-w. patch pure white.

Under surface: Very similar to the male but less olive, more greyish in ground on the hind-wing. F.-w. spots white. H.-w. patch less clear and sub-basal black mark not so parallel sided and often broken into two spots.

Variations in the female are met with: (a) in which the hind-wing above lacks any brownish suffusion at anal angle; (b) a variety in which the h.-w. patch is suffused with yellowish and the anal portion of the wing is strongly red-brown; (c) *f. extensa*, Heron, has larger white spots and patch on upper side (Ruwenzori). Often with orange suffused h.-w. patch.

ATERICA GALENE THEOPHANE, Hopff. Pl. 2, figs. 5-8.
Pl. 3, figs. 3-4.

Range: Coastal districts of Kenya.

Size similar to above. Males with less curved outer margin more acuminate and pointed apex; spots above strongly yellow, the h.-w. patch with a strong orange-red suffusion on posterior edge and outer and posterior edge of patch *not* serrated. F.-w. spotting larger. H.-w.: Marginal and submarginal row of whitish lines more pronounced. Undersurface similar to Uganda race but yellower, sub-basal spots in cell often entirely wanting, if present much more reduced.

FEMALE: Somewhat like Uganda race but hind-wing patch usually strongly suffused with orange and nearly the whole of the inner half of wing strongly brownish.

A variation of the female has orange spots on f.-w. above, and the whole of the h.-w. except for upper angle and margin strongly orange. Pl. 2, fig. 8.

EARLY STAGES: The eggs are laid singly on the upper surfaces of a thick stemmed creeper (native name (Lug.) "Seḡondo") usually on the young leaves of the root suckers. The eggs are small, about .5 mm., light yellow in colour, dome shaped with hexagonal facets, at the angles of the facet a clear spine. The egg turns grey just before the larva is due to emerge. Egg stage 7-8 days.

When newly emerged the larva is translucent olive with very small lateral spines. It does not appear to eat the egg shell. After the second moult the lateral processes are spined, and the general outline including the spines is oval. The body colour is canary yellow, but the spines, with the exception of the first and the two last are transparent with black lateral feathering. The first and two last feathery processes are black. Along the dorsum of the body is a blue and black stripe; this line under low magnification is seen to be composed of a series of jet black triangles apices toward the anal extremity separated by bright blue dots. In the last stage the larva is a flat oval (including the feathery processes) 30 mm. long by 25 mm. broad. These lateral processes are light greenish; the body colour is yellow with, along the meso-dorsal aspect, a blue line bordered on either side by small black triangles, one on each side to every segment. These black triangles are the result of division of the black triangles seen in the younger larva. The larvae lie up along the mid-rib of the leaves. When ready to pupate it loses its bright colour. Before this change takes place, the larva will devour all the leaf it is on until only the mid-rib is left and at its extremity it spins its silk and secretes a yellowish fluid. From this silken base it prepares to hang head down, and the lateral feathery processes are directed toward the ventral surface. Having attached itself it sheds its larval skin within 24 hours.

It is of interest to note here that the yellow band on the pupating stalk is highly objectionable to predatory insects such as ants. They will not cross this band. Yet, if one places a detached pupa near ants they will at once attack and eat it.

The pupa is a beautiful object. It is a semi-translucent yellowish-green, spindle shaped with darker green veinings running in wavy lines in a somewhat irregular manner. Its colour, shape and shiny surface, together with its position on the stalk or twig, give it a most remarkable resemblance to the glossy young shoots and leaf buds of the food plant.

The pupal stage lasts from ten to fourteen days.

DISTRIBUTION: The Uganda race is distributed throughout the forests and riverine forests and is common, more particularly in the central province. This race extends to the Elgon-

Nandi districts and is occasionally found in the Londiani district as also in the Kericho-Sotik areas.

The coastal race is plentiful throughout the forests and forest patches, extending inland to the Taveta area. It also extends up the Tana system to Meru at 5,000 feet. It does not appear in the highland forests of Kenya.

The flight of the male is swift and rapid gliding; that of the female is slower, but protection is afforded by its mimetic resemblance to species of *Amauris* found in the areas of its distribution. Whereas the males are often seen flying along exposed forest roadways and paths and in forest clearings, the females rather restrict themselves to the more open forest undergrowth in which the food plant is growing.

CYNANDRA OPIS, Dr. Pl. 3, figs. 5-8.

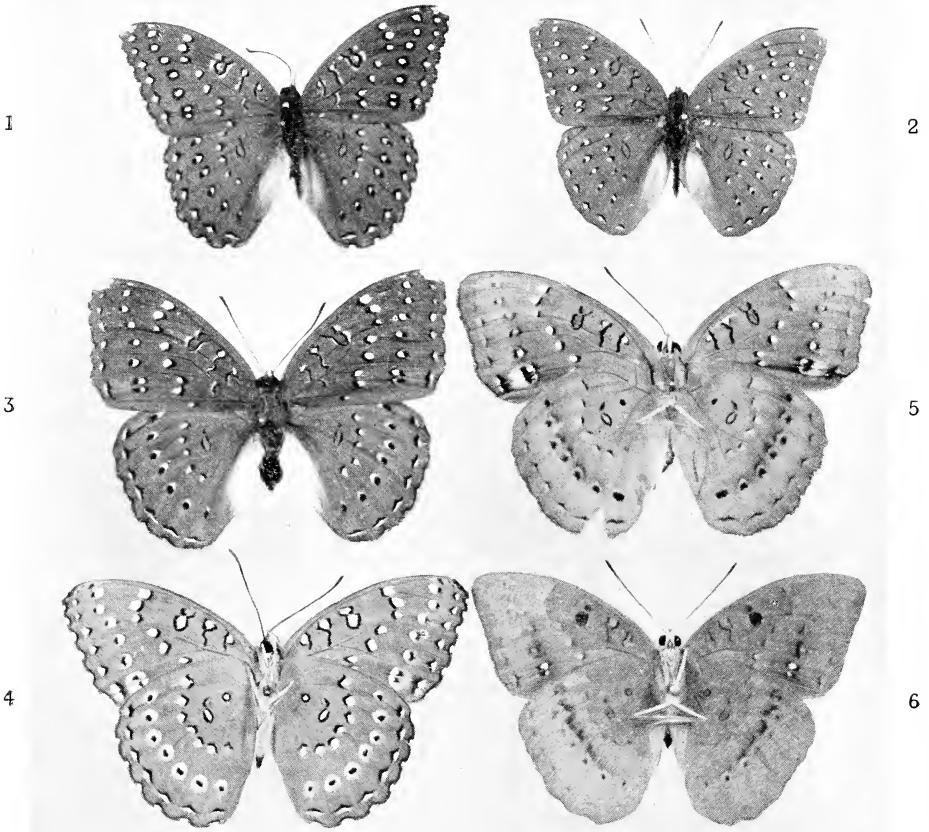
Expanse: Male, 23-27 mm.; female, 30-32 mm. Sexes unlike.

MALE: F.-w. strongly iridescent blue to black through the basal $\frac{2}{3}$ to black at the apical portion; cell crossed by four peacock-blue-green lines and a bar of the same colour at apex, this last continuous with a wavy bar of the same colour which passes through the bases of 2, 3, and sub-basal in 1a, 1b. A further line of the same colour passes from the mid-point of 1a, 1b, 2, and slightly in 3, directed toward the apex and reaching an S series of pure white though small spots which run from sub-costal in 7 to 2. There is a further blue-green bar following the contour of the wing but not reaching the hind submarginal angle.

H.-w. ground colour black with strong blue reflections over most, but not toward costa, and becoming greyish at the inner fold. Four peacock-blue-green wavy bars cross the wing; one basal, one through the apex of the cell; a third in a line from the upper angle to mid-point on inner edge; the fourth follows the contour of the wing more or less, and is contiguous with a submarginal series of blue lunate marks, the three last bars merging into one another in certain lights. The edge of both fore and hind wings white.

Under surface: F.-w. basal half brown; the cell with two lilac-grey transverse bars; the apical half of the wing mostly lilac-grey the white spots of above present below as a series of arrow-shaped white marks; towards the sub-apex, a large triangular dark-brown mark shaded with rufous, base toward margin of wing, apex toward mid-point in 4. H.-w. costa and marginal border chocolate-brown with an extension of this colour from the costa to mid-point in 8-7 and reaching a bar of the same colour which crosses the wing from sub-base in 1a,

PLATE 1



Hamanumida daedalus, F.

Figs. 1 & 2, males (seasonal variation).

Fig. 3, female, upperside.

Figs. 4-6, variation on females on underside.

PLATE 2

1



2



3



4



5



6



7



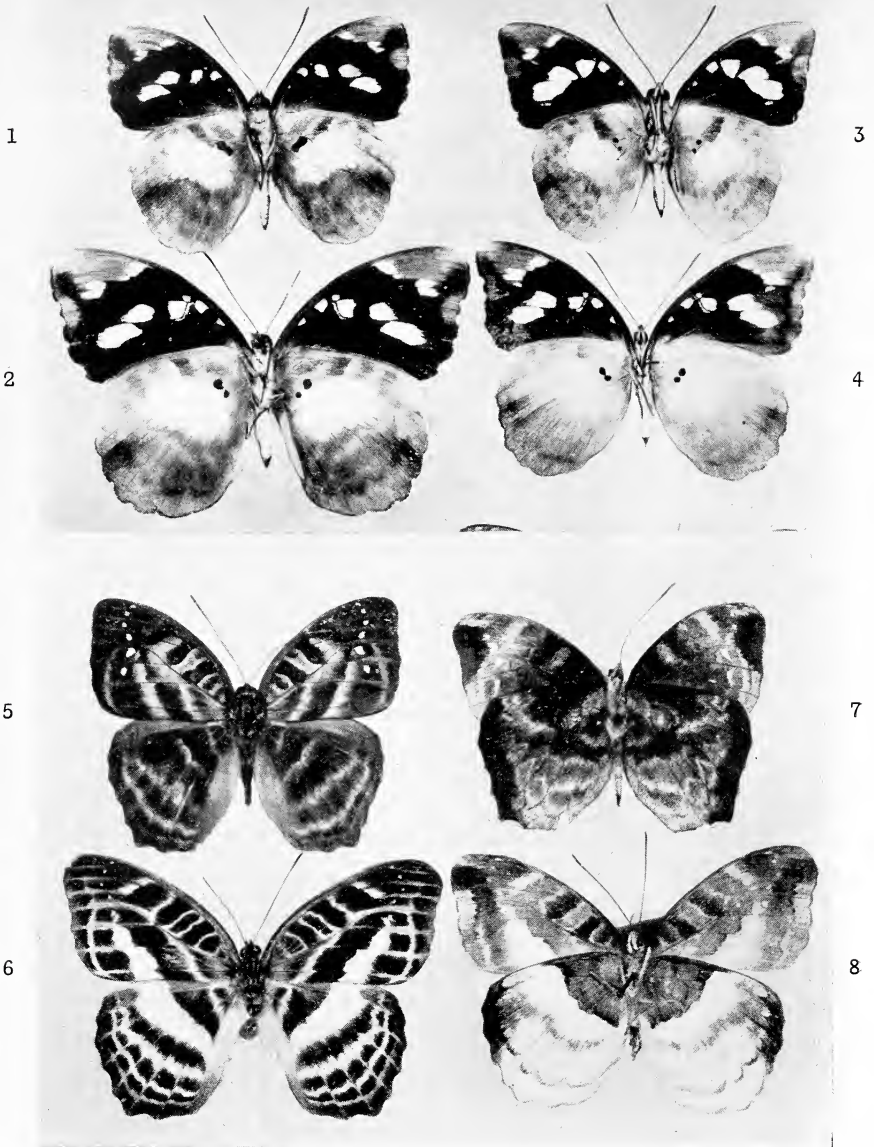
8



Aterica galene galene, Brown.
Figs. 1-2, males, Uganda.
Figs. 3-4, females, Uganda.

Aterica g. theophane, Hopff.
Figs. 5-6, males, Kenya coast.
Figs. 7-8, females, Kenya coast.

PLATE 3

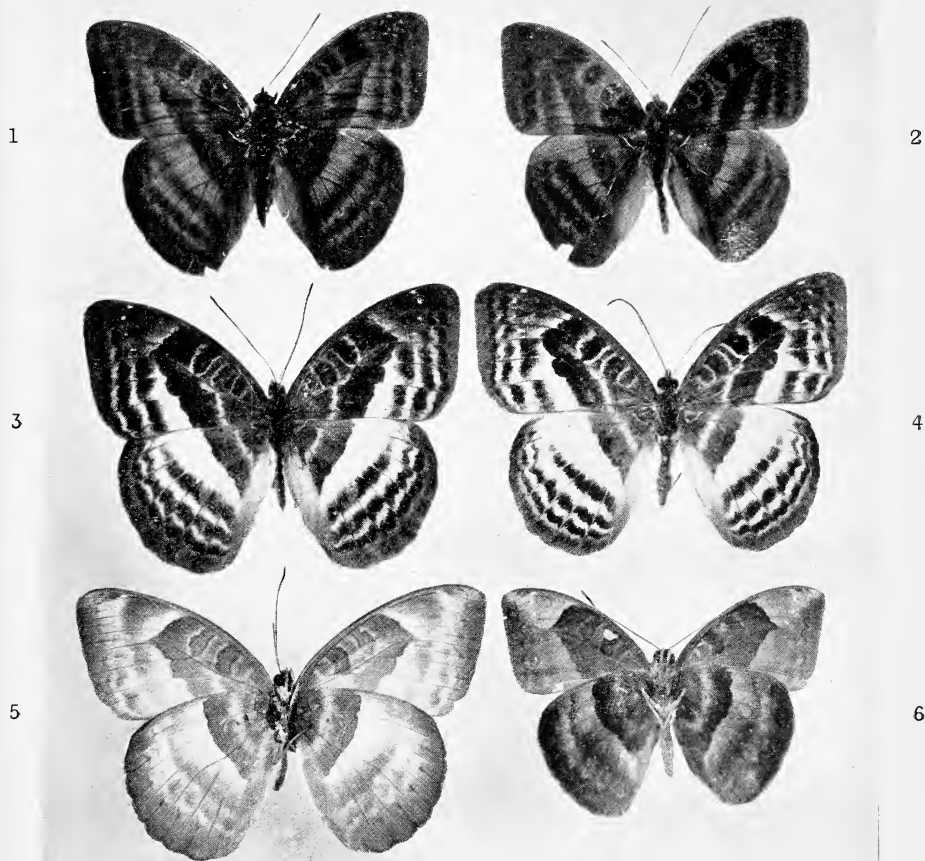


Aterica galene galene.
Fig. 1, male; fig. 2, female,
undersurfaces.

Aterica g. theophane.
Fig. 3, male; fig. 4, female,
undersurfaces.

Cyandra opis, Dr.
Figs. 5 & 7, male, upper and undersurfaces.
Figs. 6 & 8, female, upper and undersurfaces.

PLATE 4



Diestogyna ribensis, Ward.

Figs. 1 & 2, upper surfaces, males.

Fig. 6, male, undersurface.

Figs. 3 & 4, upper surfaces, females.

Fig. 5, female, undersurface.

the apex of the cell and toward the upper angle. The intervening areas are lilac-grey, this colour in the discocellulars taking the outline of "drop" marks greyish internally.

FEMALE: F.-w. ground colour olive-brown-black, the distal half of the veins ochreous. Two double line yellowish bars cross the cell, one basal, one at about mid-point, followed by single lines through the apex of the cell, with a fourth directed from the sub-costa to mid-point in vein 5. A yellowish line gradually increasing in width runs from the base of vein 4, through the base of cellule 2, 3, and sub-basal in 1a, 1b. A wide yellowish ochreous bar starts at the hind margin at mid-point in 1a, 1b, and 2, and is continued by a curved series of white spots to mid-point in 7. H.-w. ground colour as fore-wing; the yellow bar of fore-wing is continuous with one in the hind-wing from mid-point of costa, gradually tapering off to mid-point on the inner margin. An ochreous fine bar crosses the sub-base of the wing. Three wavy ochreous lines diminishing in width from inner to outer cross the discocellulars, the outermost sub-marginal and not reaching the upper angle. The veins are slightly indicated by yellowish scaling.

Under surface: Base of hind-wing and basal half of fore, lilac-grey, the yellowish bar of the upper surfaces represented below by ochreous-yellow with an increase of this colour over the greater part of the hind wing except for a brownish patch at the upper angle and two wavy brownish lines through the discocellulars. The cell of the fore-wing is crossed by two wide brown bars outlined with paler lilac and beyond the cell a further pale bar which runs continuous with the yellowish bar representing that of the upper side; the white spots of above are reproduced below, while a brownish diffuse bar is present sub-marginally and an orange patch is present on the distal end of cellules 3 and 4.

EARLY STAGES: Unknown to me.

DISTRIBUTION: Occurs in the forest of Uganda and so far not taken further east.

The male of this insect is distinctive. Its peculiar shape and highly iridescent colouration at once distinguish it from any other species. The female, on the other hand, is confusingly similar to the female of *Diestogyna ribensis* in the field, and it resembles to a lesser degree females of *D. obsoleta* and this sex of *Euryphene absolom entebbiae* and *carshena*.

The flight is a series of rapid wing beats and glides and although not long sustained, the insect is difficult to capture.

(The beautiful iridescent blue of the male of this species is probably the finest sight for the collector in Eastern Africa. The females belong to the *Diestogyna* association of mimicry,

which includes *D. ribensis*, *saphirina*, *obsoleta*, *Eu. carshena*, and *absolon* with as model for all of them, *Catuna crithea*, a species of thick forest where it behaves like the *Diestogyne*.—T.H.E.J.)

Genus *DIESTOGYNA*, Karsch.

GENERAL NOTES ON THE GROUP.

(The species of this genus are essentially forest insects, and are rarely seen, and then only for a moment even in clearings in the forest. In Kakamega, I have seen *D. ribensis* and *D. saphirina* on the roads through the forest, but always in the shade of an overhanging tree, and I regard even this as unusual. They prefer dense forest where both sexes may be observed feeding on the ground, on fallen fruits, or the males may be seen sitting for a time, on a leaf, sun-bathing. When feeding the wings are always closed, showing only the procraptic, leaf-like undersides, but when sunning themselves the wings are held wide open and the beauty of the iridescent blues and purples has to be seen to be believed. They are very easily disturbed and the slightest movement will send them darting off into the undergrowth. The power of detecting moving objects is highly developed, more in this group of Nymphalids than any other.

I have waited sometimes for more than half an hour at a time watching a single insect until it came within reach; the slightest forward movement would scare it away. The females are much easier to capture as they fly more slowly, just above the undergrowth, intent on finding their respective food-plants.—T.H.E.J.)

DIESTOGYNA RIBENSIS, Ward. Pl. 4, figs. 1-6.

Expanse: Male, 25-28 mm.; dwarf specimens common, measuring from 18 mm. Female, 28-35 mm. Sexes unlike.

MALE: F.-w. Ground colour dark-brown shot with purple over the greater part of the hind portion; three darker transverse bars in the cell, one wider one beyond cell apex continuous with and at an angle to a broader dark bar running from base of 3, sub-base 2, sub-base 1b, and just internal to mid-point 1a. A basal bar in 1a and 1b. Two sub-marginal rows of darker spots run from apex to hind angle, and a further more diffuse bar through mid-point 3 to just outside mid-point 1a. Fringe of wing slightly white; tip of apex often white. Many specimens with a narrow dark bar between second and third of cell.

H.-w.: Ground colour as fore, paling off at costa. Base with a dark triangle, followed by a broad dark bar. The sub-

marginal row of spots continued through the hind wing, as also the mid-bar.

There is a tendency for specimens from the Kakamega area to be more shot with bluish than purplish.

FEMALE: Ground colour olive-brown. F.-w.: Cell crossed by double lines of ochreous, the first pair in shape of a U, the second more parallel, and a further narrow line just beyond apex; beyond this is a straight narrow bar extending from costa to vein 3 then carried down at an angle and gradually widening to a broad bar through 3 to the hind edge. Toward base of wing is a narrow yellowish line sub-basal in 1a, 1b, and reaching the second double line of the cell. Beyond the broad median bar are two yellowish lines, the more internal continued up toward the costa as four white dots, the outer and sub-marginal bar runs up to just internal of the apex, and outlined externally by dark areas, often carried out to margin along veins. Extreme tip of apex white.

H.-w.: Ground colour as fore; a narrow sub-basal yellowish bar; median bar widest at costa and gradually narrowing to mid-point on inner edge; this is followed by a narrower yellowish bar contiguous at the costa and passing from 7, toward the hind angle; beyond this two further yellowish wavy bars, the outermost narrow and less yellow. Extreme margin slightly ochreous at veins.

Undersurface, male: General ground colour chocolate-brown with more orange in areas corresponding to purplish ones of above; sub-costal half of apex strongly lilac as also intervening paler areas in cell. H.-w. ground colour as fore, with lilac areas corresponding to purple areas of above.

Undersurface, female: More variable; pattern as above but yellowish areas not so pronounced owing to more ochreous tone of ground colour; sub-costal half of apex with greyish or lilac as also the intervening spaces in cell. H.-w. pattern more or less as above but yellowish areas less defined, more diffuse and basal triangle with a lilac dislegnic bar.

EARLY STAGES: The eggs are laid either singly or many close together in bunches on the leaves of *Sp. indet.* They are dome shaped, covered with hexagonal facets with transparent glistening spines arising from each angle of the facets. In sunlight these eggs attract attention for they sparkle like minute dew-drops. The colour is pearly when first laid but they turn greyish as the larva develops inside. The egg stage lasts seven days. When the young larva emerges it eats the vacated egg shell. At first translucent green with fine black transparent hairs projecting laterally, one on each side of each segment from the second to the penultimate and one short spine mid-

dorsal; at the third instar it becomes less translucent, more greenish and an orange spot appears on the dorsum of the first abdominal segment. The lateral processes are seen to have three short branched hairs curved forward, the three hairs arising from one side only. The head is ochreous. At each moult the larva eats its cast skin.

The mature larva is flat, somewhat oval in outline, being 28 mm. by 20 mm. The head is greenish horn covered with fine black hairs. The body segments carry feathery lateral projections on each segment from the second to penultimate. The two from the second thoracic segment point directly forward and cover the head, while the remainder with the exception of the last are directed outward; the last is directed backward. Each feathery projection consists of a central stem, black save for the base which is yellow, and from the stem there are shorter yellow hairs. At the base of each lateral spine is a tuft of fine yellow hairs giving the larva a generally yellow appearance. The first abdominal segment has now a crimson spot. When resting the larva selects the line of the mid-rib of the leaf, and is not at all conspicuous.

The pupa is spindle shaped, bright canary yellow with veinings of darker yellow anteriorly and on the wing scutae and a darker line along the dorsum of the abdomen. The head has two parallel and contiguous projections. The abdominal spiracles are often orange. As in *Aterica galene* the larva pupates at the end of the mid-rib of a leaf from which the lateral portions have been eaten; or sometimes from the tip of a fine twig. The tip is spun over and prepared with a secretion, yellowish in colour, which acts as a deterrent to predatory ants. As in *Aterica*, the larvae hang from this silken pad and bring the lateral feathery spines forward over the ventral surface.

DISTRIBUTION: This species is found in the deep shady forests and are undoubtedly seasonal. On an average, the months of June and July are the best, but emergence is regulated by the climatic conditions prevailing. We have noted that the species is more addicted to the moist areas of forest rather than the outskirts and are to be found in the deeper glades and depressions where vegetation is rank. It has been recorded from forests throughout Uganda and extends east to N. Elgon and to Nandi (F. Jackson) and S. Kavirondo—Kisii (v. S. and W.F.). As already noted, there is a slight differentiation between western and Kakamega specimens, but not sufficiently constant to warrant separation.

The flight is that common to most of the group, a series of rapid wing beats and gliding. There is a close resemblance between females of the species and females of *Cynandra opis*,

and into this mimetic association comes *Catuna crithea*, and certain female *Euryphebe*.

DIESTOGYNA OBSOLETA, Grunb. Pl. 5, figs. 1-2; 5-6.

=*D. amaranta*, Karsch. Syn. ♀.

=*integribasis*, Hulst.

Expanse, males: 25-27 mm. Females: 30 mm. Sexes unlike.

MALE: F.-w. ground colour brown-black with dark purplish-blue reflections. Dark markings rather obscured as follows: Cell with dark base followed by two broad bars, with a third just beyond cell; the second and third bar continued to the base of 1a, 1b, the latter by dark bar sub-basal in 1a, 1b. The bar beyond the cell is continued through the mid-point of 1a, 1b, and 2. Two other dark bars of rounded spots are present, the inner starting from just internal to the hind angle runs from 1a to 4 and is continued up towards the costa as three to four white spots; the outer series is submarginal; wing fringe white, tip of apex narrowly white.

H.-w.: Brown-black, more brown toward costa, with strong dark blue reflections more intense toward anal angle, darker spotting in bar formation diffuse; base of wing dark, followed by three more or less parallel series of spots, the inner two large, the outer smaller and submarginal. Wing fringe pale, but not white except at end of each vein.

Undersurface: F.-w. ground colour ochreous grey shaded with orange and rufous more particularly as a patch along the outer edge. The dark bars above are reproduced below as brownish bars with pale edges. H.-w. generally more rusty rufous with a yellowish bar crossing from the base of 7, through the cell and sub-base in 1c. A second row of yellowish spots runs from mid-point 7 to just above mid-point in inner edge; there is a submarginal row of blackish angles and internal to this a series of yellowish dots outlined in blackish, and black shading internally.

FEMALE: Ground colour olive-brownish, with darker olive brown between the ochreous yellow bars. Bars as follows: two double line bars in the cell, one just beyond; from the upper line of the second bar, a yellowish line passing from root of vein 2 to sub-basal in 1a; a further line starts below the costa passing cellule 6, 5, 3 sub-basal then is much angled in 2, set more internal in 1a and 1b, at mid-point. The distal half of the wing has a double row of yellowish lines in the form of contiguous circles in areas 1b, 2, 3, 4; in 5-7 the marks break up into discreet spots, the internal ones white. Fringe of wing with white spots at ends of veins; upper tip of apex white.

H.-w.: Ground colour olive-brown, the basal triangle with a diffuse narrow yellowish bar; a wide yellowish bar starts below the costa at mid-point, widens out rapidly to fill the greater part of areas 4-7, tapering off rapidly as it crosses the bases of 3, 2, and 1c, and does not reach the inner fold. From the mid-point of cellule 4 a series of contiguous crescentic marks reach the anal angle; beyond this a wavy line starts at 5 and curves toward the anal angle, accentuated on the outer edge by dark olive.

Undersurface: Ground colour ochreous to naples-yellow; bases of fore and hind-wings with lilac-grey patches crossed by indistinct ochreous lines, those of the cell above reproduced below. Beyond the lilac area in the fore-wing and just below the costa a series of fine wavy parallel lilac lines forming a triangle; distal third of wing shaded with rufous in which there is a sub-marginal series of blackish angular marks. The hind wing has two parallel series of diffuse lilac angular marks while the outer border is rufescent tinged.

EARLY STAGES: These are unknown to me.

DISTRIBUTION: Occurs in the forested areas of Uganda in the more moist and dense parts. It is not as plentiful as others of this genus. I have not found it east of Entebbe, except in the Mabira forest. Reference has already been made to the similarity between females of this species and others already dealt with. The more transverse direction of the yellowish bar of the hind-wing helps to distinguish it in the field, as also does the more angled mid-bar of the fore-wing. Little is known of its general habits. [Commonest in E. Uganda, round Kampala. —T.H.E.J.]

DIESTOBYNA PALLIDIOR, Hulst. Pl. 5, figs. 3-4; 7-8.

= *umbrina*, Talbot, nec. Auriv.

Expanse: Male, 50 mm.; length of fore-wing, 29-30 mm.

MALE: General ground colour fuscus-brown with a strong purple bloom. Fore-wing strongly purple at the basal area, less so marginally; cell crossed by a double dark bar with paler outlines. There is an indistinct, curved pale bar which, starting at the costa just beyond the mid-point runs through the disc of the wing to the mid-point on the hind-margin; the outer margin is shaded darker than the ground colour. Beyond this are two rows of dark spots, one sub-marginal, the other more internal and more or less parallel to the outer margin of the wing.

Hind-wing: More brownish along the costa, and strongly purple over the inner half. The disc of the wing is crossed by

diffuse dark contiguous spots and beyond by two further rows, one sub-marginal, the other running parallel and more internal.

Underside: Fore-wing ochreous, more brownish basally; cell with the usual bars. Beyond the dark basal area the ground colour pales to a more yellowish zone corresponding to the pale bar above. The double row of spots above are represented by black dots.

Hind-wing ochreous with a darker base, distally with a zigzag outline most angled at vein 3. The internal of the two rows of spots above are here represented by blackish dots proximally shaded with ochreous, distally with a darkening of the ground whilst the submarginal row is represented by a series of dusky loops. The cell contains a pale spot outlined with blackish. There is a dark diffuse spot beyond the apex of cell in area 4.

FEMALE: Fore-wing: Dusky ochreous-brown; cell with double bar and basal spot outlined with ochreous. A well-marked creamy bar, tinged with ochreous distally, crosses the wing from the costa at the angle between vein 6 and the costa, and is more or less parallel sided, about 3 mm. wide then decreases in width in area 3 and tapers out and is slightly curved inward in 2. There is a large pale patch in 1b. There are four sub-apical white dots set in a curve in 4-7; beyond these are diffuse blackish spots which extend back through 3-1b. This is followed by a more distinct series of sub-marginal blackish spots from the hind-angle to the apex.

Hind-wing: Dusky ochreous-brown with the basal area darker and defined distally; a post-discal row of large diffuse dark brownish spots curve through the wing from the costa to just above the hind-angle, whilst beyond this there is a series of dark loops; internal to both these rows there are ochreous bars which set off the lines. The wing fringe is ochreous.

Underside: Ochreous more so on the hind margin of the fore-wing, the rest dusted over with greyish especially toward the upper half of the apical triangle. The lines of the cell are apparent whilst the fore-wing bar is distinct and yellowish tinged anteriorly. The white sub-apical dots of above are distinctly reproduced below. Sub-marginally there is a row of faint dark dots. Hind-wing: basal area dark ochreous brown with a dentate outer margin; the cell with a dark ring outlined by a paler zone. There is a diffuse greyish spot beyond the cell in 4, shading to brownish distally. The post-discal row of large diffuse greyish ochreous spots carry a small ochreous dot outlined with darker brownish at their proximal point and are outlined with paler ochreous; the sub-marginal row of crescentic lines of above are here represented by diffuse

lines. The outer margin of the wing is shaded with brownish while the fringe is ochreous.

EARLY STAGES: Unknown.

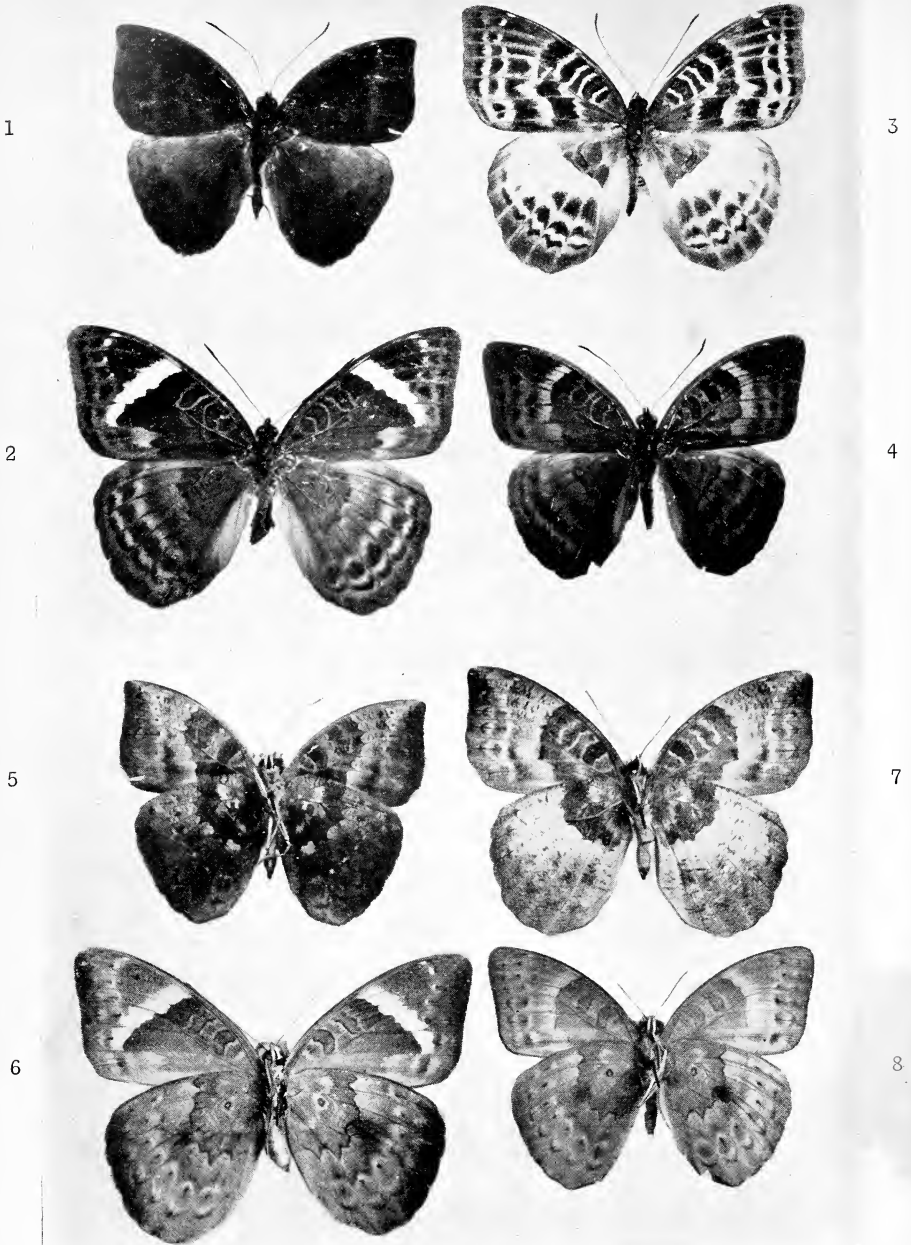
DISTRIBUTION: South-western Uganda in the Katera Forest; taken by T. H. E. Jackson.

DIESTOGYNA CHALYBEATA, Talbot. Pl. 6, figs. 2 and 7.
Pl. 7, figs. 3 and 4.

As I have no examples of the males of this species I quote the original description published in *Trans. Ent. Soc.*, Vol. 86, pt. 4, pp. 70-71.

"The upperside colouration resembles *simplex*, Stgr., or *saphirina*, Karsch. Underside markings somewhat as in *obsoleta*, Grunb., especially the hind wings. The vestiture on the inner area of the hind-wing is posteriorly developed to form a tuft.

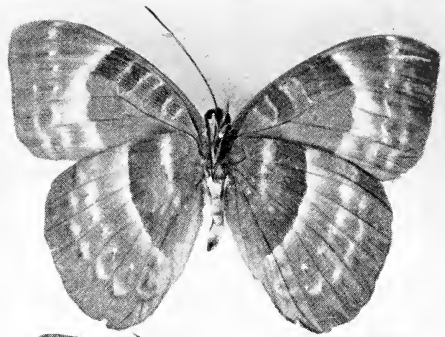
"MALE: Upperside: dark leaden blue with a greenish tinge on the fore-wing; markings indistinct. Fore-wing with the usual cell mark. The post-discal line is only visible as far as vein 2, and from vein 5 to vein 2 is almost straight or at right angles to the inner margin. The submarginal band of dark spots is narrower than in *obsoleta*, and wider than in *saphirina*. As in the latter species, there are no subapical white dots, and the apex and outer border are blackish for about 3 mm., narrowing to the tornus below vein 2. Hind-wing with pale smoky-brown costal area as in *obsoleta*, and reaching vein 4 as in that species; similarly the anterior part of the two submarginal lines of blackish spots is distinct on the pale apical area, though less defined than in *obsoleta*. The fringe of blackish hair along vein 1b is strongly developed, but stops at about 7 mm. from the margin and forms a pronounced tuft which reaches to within 5 mm. of the margin; the hair forming this tuft rises chiefly from the fold in 1c, and no hair rises above the fold as is the case in the two allied species where it covers most of the area. Underside chestnut-brown strongly irrorated or freckled with smoky-brown. Basal area dark smoky-brown with indistinct cell-marks. Discal line as in *obsoleta*, of the same curvature and outline. Distal apical and costal area to vein 4 dusted with bluish-white. Posterior area pale smoky-brown. The two dark sub-marginal bands as on the upperside and not distinct; proximally to the inner band are four bluish-white dots in areas 4, 5, 6, and 8. Hind-wing ground-colour deep chestnut with darker basal area. A rounded and conspicuous pale buff spot near base of area 7, and a similar but somewhat square or oblong spot in 1c on the edge of the dark basal area; similar pale spots, though less defined, are found in *obsoleta*.



Diestogyna obsoleta, Grunb.
 Figs. 1 & 5, male, upper and under surfaces.
 Figs. 2 & 6, female, upper and under surfaces.

Diestogyna pallidior, Hulst.
 Figs. 4 & 8, male, upper and under surfaces.
 Figs. 3 & 7, female, upper and under surfaces.

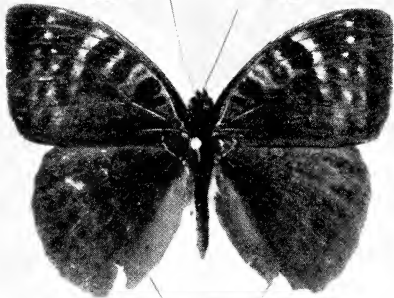
- Figs. 1 & 6, *Diestogyna butleri*; upper and underside, female.
Figs. 2 & 7, *Diestogyna chalybeata*, Talbot; upper and underside, male.
Figs. 3 & 8, *Diestogyna jacksoni*, Talbot; upper and underside, male.
Figs. 4 & 9, *Diestogyna theodota*; upper and underside, male.
Figs. 5 & 10, *Diestogyna gambiae*, Feisth; upper and underside, male.



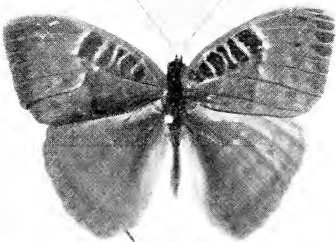
6



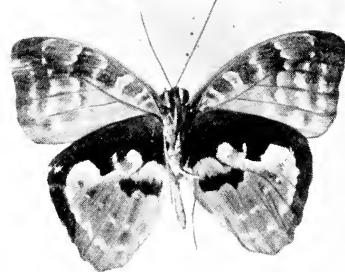
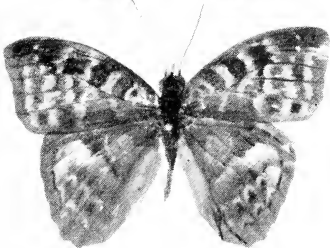
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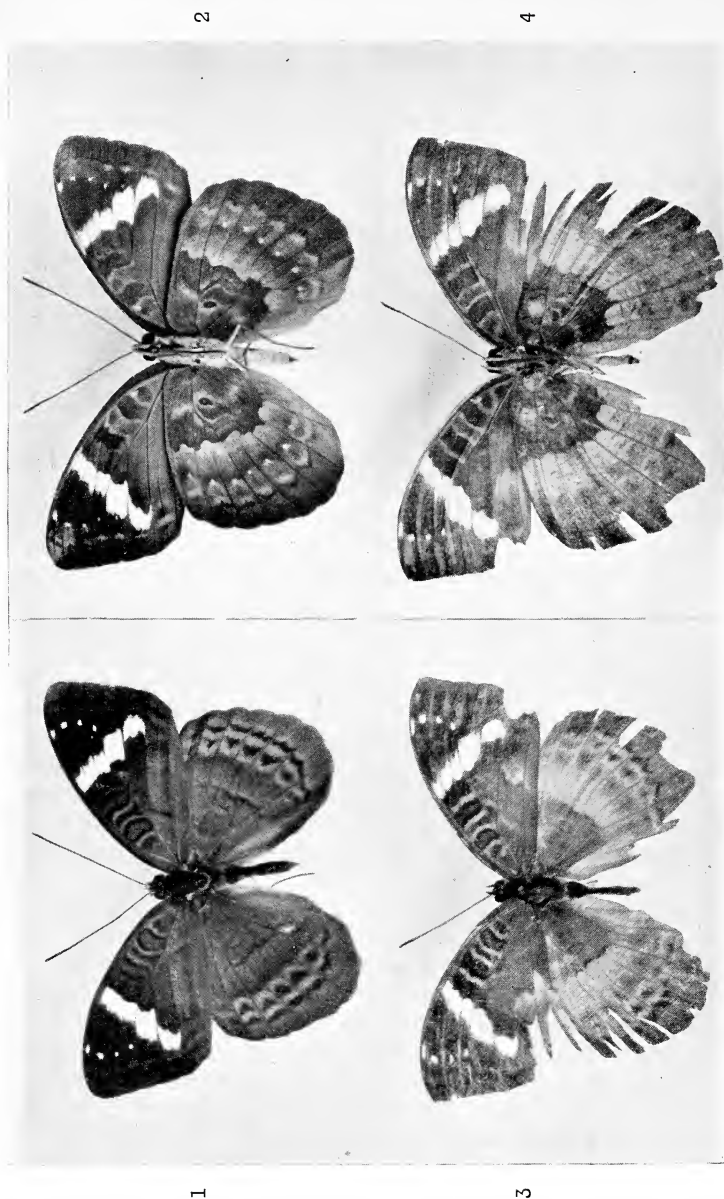


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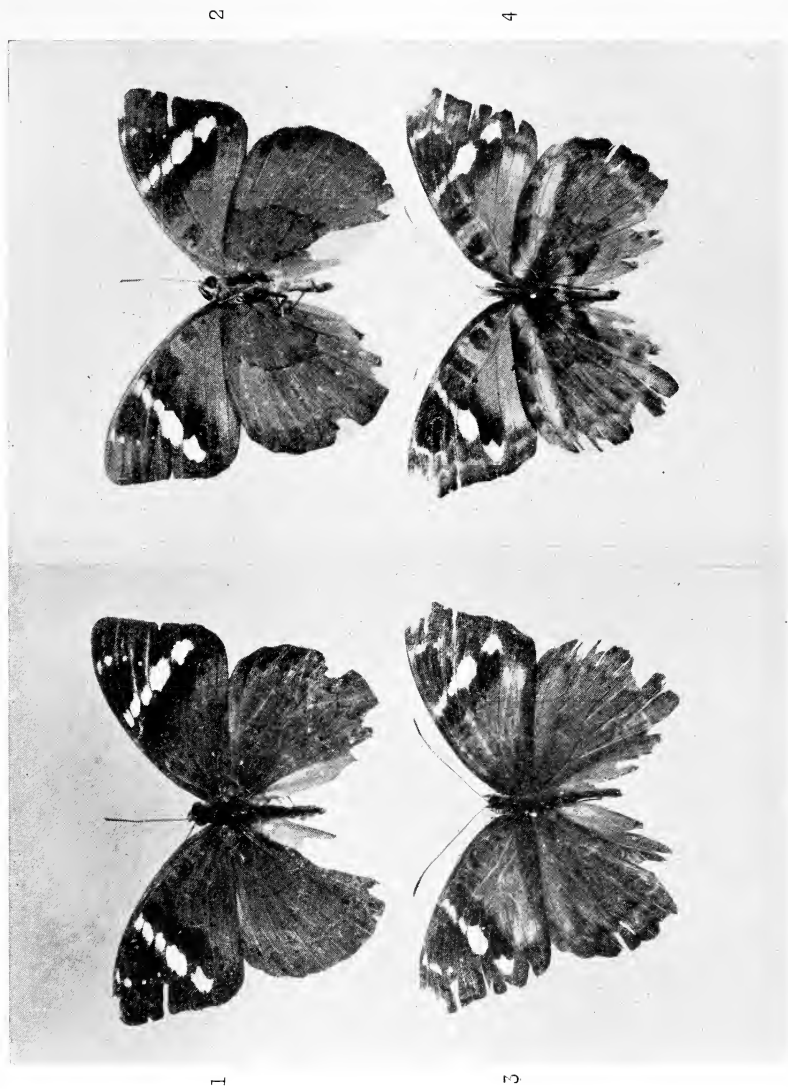
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PLATE 7



Diestogyna theodoia. Figs. 1 & 2, upper and under surfaces, female.
Diestogyna chalybeata, Talbot. Figs. 3 & 4, upper and under surfaces, female.

PLATE 8



Diestogyma jacksoni, Talbot. Figs. 1 & 2, upper and under surfaces, female.
Diestogyma atossa, Hewit. Figs. 3 & 4, upper and under surfaces, female.

"The basal area is bordered diffusely with deep chestnut, and there is a post-discal band of similar colour, broken up into spots, each spot with an indistinct white dot upon its proximal edge. The distal area irrorated with smoky-brown, and bearing an indistinct blackish waved submarginal line. Fringe of fore-wing white, blackish at veins; of the hind-wing black. Abdomen with grey ventral surface; in *obsoleta* it is ochraceous.

"FEMALE: Resembles somewhat *atropurpurea*, Auriv., on upperside, and *amaranta*, Ksch., on the underside. Upperside of fore-wing dull ochreous in basal area as in *atropurpurea*, with the three dark cell-patches sharply outlined with ochreous; the patch across the end of the cell is larger than in the two species mentioned. The pale patch lying between vein 2 and inner margin is large in the type and in specimen 2; in specimen 3 it is as in *atropurpurea*, and in specimen 4 it is represented by a curved buff-coloured mark in 1b. The dark angled line edging the inner side of this patch is much the same as in *atropurpurea*. It may be mentioned here that this submedian patch is absent in *amaranta*. The white band is quite the same as in *atropurpurea* and the usual four white apical spots are present. Hind-wing closely resembles *atropurpurea* in markings.

"The discal line, which edges the dark basal area, is slightly curved and fairly even. The post-discal blackish patches, more distinctly developed than in *atropurpurea*, very large in specimen 4 where also the second post-discal row of dark patches is more developed; in the other specimens these patches, as well as the submarginal sagittate line, are as in *atropurpurea*. Under-side more as in *karschi* and *amaranta*. Fore-wing with cell-marks and whitish-dusted apical area as in the male. An indistinct ochreous submarginal band about 3 mm. wide from costa to vein 4, the white dots, as above, on its inner edge. The pale submedian patch reproduced but less distinct than above. Hind-wing basal area blackish-brown irrorated with pale buff to a variable extent. The irregularities along the edge of the basal area, including the tooth on vein 2, are just as in the male. There is a pale ochreous spot near the base of area 7 as in the male, and from this, to the margin near the base, is a curved blackish band, constricted slightly in the cell, and including the dark rounded cell-spot. Distal area pale ochreous, more or less strongly freckled with chestnut. The post-discal blackish spots as on the upperside; indistinct in the type and in specimen 2 but very distinct in the other two examples; in allied forms these spots are either small triangles or mere dots. A waved dark submarginal line as in *karschi* but still heavier; the space between this line and the margin more or less irrorated with blackish. Fringe of both wings black. Length of fore-wing: male, 27-30 m.m; female, 32-33 mm."

EARLY STAGES: Unknown.

DISTRIBUTION: The south-western area of Uganda, Malabigambo Forest, Katera, with an extension into Eastern Congo. The species has been taken by T. H. E. Jackson, who secured the type and other examples.

DIESTOBYNA JACKSONI, Talbot. Pl. 6, figs. 3 and 8.

Pl. 8. figs. 1 and 2.

This is another recently described species, and as only a single female is available to me, I quote the original description. *Trans. Ent. Soc.*, Vol. 86, pt. 4, pp. 69-70.

"Allied to *feronia*, Stgr., also in some respects to an unnamed species in the British Museum from the Cameroons, and in its underside pattern to *simplex*, Stgr.

"MALE: Upperside, deep blue, but not so bright as in *feronia*, the median area of fore-wing and the hind-wing purplish. Fore-wing cell-marks as usual in the genus; the dark oval spots are edged on the outsides with violet-blue in the type, with purple in the Uganda specimen, showing as four violet-blue bars, the basal one indistinct, the outer one strongly marked over the cross-veins. A similarly coloured and heavier post-cellular line, slightly curved from costa to vein 2, but indistinct below vein 3; in the Uganda specimen this line is altogether less distinct. Four white sub-apical dots as in *feronia*, with a violet-blue dot in area 3 placed below the one in 4, a similar but larger and more obscure dot in area 2 placed a little distal of the one in 3, and a similar but small dot below vein 2 placed in line with the one in area 3. This line of dots is absent in the Uganda specimen, though there are indistinct traces of it. A submarginal series of semi-crescentic black spots similar to those in *feronia* but a little larger; between these spots and the post-discal line of dots is a line of somewhat square-shaped black spots each with an indistinct outer violet edging, not apparent in the Uganda specimen. Hind-wing with costal area fuscus-brown to vein 6; in *feronia* it extends to vein 4. A thin black very slightly curved discal line from vein 2 to vein 6, crossing area 2 near its base. A heavy black waved submarginal line from vein 2 to vein 6, less marked and more even in the Uganda specimen. Between the discal and submarginal lines are two indistinct blackish post-discal bands of spots, the inner one broader than the outer; in the Uganda specimen only the outer line is distinct, and the spots forming it are short bars. The outer marginal border is fuscus-brown and less suffused with purple.

"Underside rufous-brown, resembling *simplex* in colour and markings, and not *feronia*; the type specimen more

ochreous. Fore-wing cell-marks as in allied species. Post-discal line with the part below vein 4 nearly even and straight, directed more distad than in *simplex* or *feronia*; it is bordered outwardly with paler brown, somewhat as in *simplex*. A post-discal row of white dots, representing the line on the upperside, much less distinct in the Uganda specimen. Mid-way between these dots and the margin is a deep brown submarginal line marked with ochreous along its inner edge. In the space between the two lines mentioned there are grey-black patches in 1b, 2, and 3. Hind-wing basal area only a little darker than the distal area. Cell-spot not blackened. Discal line more curved than in *simplex*, and passing farther from the point of origin of veins 3 and 4 than it does in that species; this line is narrowly edged outwardly with white. A post-discal row of white dots, and a submarginal line as in other species.

"FEMALE: Not resembling *simplex* or *feronia* but strongly suggestive of *amaranta*, Krsch., or *atrovireus*, Mab., female. Upperside: Fore-wing with the rufous-brown area extending beyond the cell and into the base of area 3, with its edge sharply defined. A band of five white spots as in other species, but not compact as in *simplex* or *feronia*; the three anterior spots are separated by the veins and wider than in *amaranta*; the third spot in 4 has a characteristic proximal projection in the upper part of the cellule, and there is a similar projection to the large and somewhat rounded spot in 2, whilst a more obvious projection is seen on the lower and smaller curved spot. Four white subapical dots as in the allied species. Hind-wing differing essentially from similar females of other species in its blackish-brown marginal border which almost touches the black and slightly waved submarginal line. Discal black line thin and sharply defined. A thin black divided post-discal streak in each of the areas 2-5. Underside: Colouration and hind-wing markings as in the male. Fore-wing with ground colour as in the hind-wing, paler below the cell, and with a diffuse blackish patch in areas 2 and 3 over the area in which are placed the two white dots. Hind-wing a little paler than in the male. Discal line indistinctly edged with white, and the tooth on vein 2 larger. Fringes in both sexes black, in the male with a white dot at apex of the fore-wing.

"Length of fore-wing: Male, 30 mm. (type), 29 mm. Uganda specimen; female, 35 mm."

EARLY STAGES: Unknown.

DISTRIBUTION: Occurs in the south-western portion of Uganda in the Malabigambo Forest, Katera, where T. H. E. Jackson obtained specimens. It extends into the eastern Belgian Congo.

DIESTOGYNA SAPHIRINA, Karsch. Pl. 9, figs. 1-6.

= *D. hobleyi*, Neave. Syn. ♀.

Expanse: Males, 23-25 mm.; females, 28-33 mm. Sexes unlike.

MALE: F.-w. brown-black with dark blue reflections. Cell with lighter blue cross bars, one sub-basal, followed by two parallel near apex; one just beyond and a further ill-defined line crossing the sub-base of 6-5-4 is lost in 3. There is sometimes an indication of a further submarginal bar. Between the bars slight darkening of the scales to form diffuse spots. Apex white tipped.

H.-w.: Black-brown in ground colour, more strongly bluish toward hind angle. Four rows of more or less parallel dark spots cross the disc of the wing, the innermost crosses through the apex of the cell, the outer one sub-marginal.

Undersurface: Brownish with shading of rufous more toward the outer side of the fore-wing and over the hind-wing. Barring of the cell slightly indicated, but the line beyond the cell is more defined and whitish-ochreous and extends from the costa sub-basal in 7 through sub-bases of 6-4, then at about mid-point in 1a, 1b, where it fades out. There is also a sub-marginal row of small black dots and angles, internal to this a further row of black spots sometimes whitish proximally. The hind-wing has a black diffuse spot just beyond the cell which is sometimes carried on above and below as a diffuse dark line to the costa on the one side and toward but not reaching the inner fold on the other side. There is a series of sub-marginal dark angular spots and internal to this a series of fine whitish dots darkened distally.

FEMALE: Ground colour olive-brown with darkening between the napes to ochreous lines. The cell is crossed by narrow lines, a circle toward the sub-base, followed by two lines, the upper one continuous with a line crossing the base of 2, and sub-base of 1b; beyond the cell a straight light line, followed by a transverse sub-apical yellow bar, which varies in width, extending from the sub-costa in 6 toward the hind angle but ending in a somewhat crescentic mark in 2. The mid-point of 1a and 1b with a light bar proximally edged with darker olive.

A series of white dots in a curve through 7-4 and distal to this a sub-marginal row of dark spots—proximally shaded with lighter olive—follows the contour of the wing.

H.-w.: Olive-brown, with a broad yellowish bar from a point on the mid-costa fills the proximal half of cellules 6-3 and fades out toward the inner margin; sub-distal edge of the band with olive dots, often triangular in shape in cellules 6-1c and

the distal edge accentuated by a dark wavy line. The marginal border of the wing often with pale veins and darker intervening areas.

Undersurface: Variable, as to amount of purply-brown flush. F.-w. ground colour brownish-olive darkening toward distal half and outer margin of wing flushed with rusty to chestnut. Marks of above reproduced below as whitish lines and bars.

H.-w.: Basal area grey brown with a lilac line; yellowish bar of above only slightly indicated below in 6-4, but distally indicated by a series of ovals dark inside and white dotted proximally with a dark angular spot distally.

EARLY STAGES: Unknown to me.

DISTRIBUTION: Distributed through the forests of Uganda and extending to the Elgon-Nandi districts and patches of forest in South Kavirondo, Kisii, to Chepalunga.

The female described as *hobleyi* by Neave is now considered a synonym of *Saphirina*, and probably synonymous with *albo-punctata*, Auriv. Females of this species are somewhat variable, more especially as regards the oblique bar of the forewing. This species is found only in forest country.

DIESTOGYNA GAMBIAE, Feisth. Pl. 6, figs. 5 and 10.

This species is included on the evidence of one specimen taken by the late Sir Frederick Jackson, and said to have come from Uganda (labelled merely "East Africa"). As we have no specimens, Mr. Talbot has very kindly supplied the following description:

MALE: Upperside with blackish-brown ground colour, and dark ochraceous markings, sometimes suffused. Fore-wing with prominent spot in middle of cell, outlined with ochraceous; two discal ochraceous lines forming a U-shaped spot enclosing the discocellulars; a sub-basal, or median, short line from origin of vein 2 to inner margin; a discal, irregular, short line, from vein 4, where it connects with outer edge of U-shaped spot, to vein 2; a post-discal, irregular line from costa to inner margin, its anterior part, to vein 4, much thinner than its lower part which projects proximad below vein 2; a second and similar post-discal line, its anterior part formed of three dots in areas 4-6; a submarginal line, divided by the dark veins, and obsolete above vein 5. Cilia white, alternated with black at the veins. Hind-wing with a prominent discal ochraceous line, from vein 2-7 more or less diffused distad; cell more or less dusted ochraceous; discocellular spot conspicuous, and centred with ochraceous; a post-discal series of small black spots, darker than the ground-colour, the proximal ochraceous edgings to these spots

forming a lunulate line in dark specimens; a submarginal black line, edged ochraceous on its inner side.

Underside: Fore-wing with posterior area from vein 4, and including lower margin of cell ochraceous-yellow; anterior area deep chocolate-brown, more or less dusted white; markings as above, pinkish-brown. Hind-wing with an anterior area of very deep chocolate-brown, comprising the whole of areas 7-8, the basal area including base of cell, the basal parts of areas 5 and 6, and extending along outer margin to vein 3; a median bar of the same colour, from below vein 1a to origin of vein 2; posterior area of wing more or less pinkish-brown, dusted with cream, more deeply coloured in the post-discal area; post-discal spots of upperside represented by black dots; the pale area extends to the margin below vein 3.

FEMALE: Markings similar to those of the male, but pale yellow to white. Hind-wing with a prominent, broad, yellow or rarely white cross-band, its distal edge, between veins 5 and 7, broad, the band narrowing sharply below vein 5 to almost a point in area 1c; the upper edge of this band is sharply defined and irregular, the lower edge diffuse and more even; the outer half of the cell and posterior area of wing slightly washed with ochraceous; post-discal and submarginal lunulate yellowish lines. Underside as in the male, but pale areas are pale buff or creamy-white.

DISTRIBUTION: Uncertain, so far as Uganda is concerned. Vide opening remarks.

DIESTOBYNA BUTLERI, Auriv. Pl. 6, figs. 1 and 6.

(= female of *amaranta*, Karsch., as described by Butler.)

The male appears to be unknown. We are indebted to Mr. Talbot for a description of the female.

FEMALE: Upperside ground colour umber-brown, with pale ochraceous markings; fore-wing with the usual *Diestogyna* basal marks, but rather faint; a post-discal, rather prominent band from vein 9 to inner margin, curved strongly outwards, wider between veins 2 and 4, its inner edge crenulate and sharply defined, its outer edge diffuse and more even; two submarginal, somewhat crenulate and nearly parallel lines; the inner of the two submarginal lines has its anterior part, in areas 4-6 formed of white dots.

Hind-wing with a discal narrow band, narrowing posteriorly to vein 1a, and from vein 7 curved sharply inward to costa; a post-discal and still narrower band, its outer edge lunulate; a somewhat uneven submarginal line; a second, much thinner and duller, submarginal line defining an outer border, slightly paler than the ground-colour.

Underside of fore-wing with proximal area pale umber-brown, limited by post-discal band as above; submarginal markings less distinct than above. Hind-wing with ground-colour paler than above; a sub-basal, narrow, whitish band; a discal band as above, but pinkish-white, and outwardly diffuse; submarginal markings as above, but pinkish-white.

Antennae dark reddish-brown; palpi pale reddish-brown touched with white at base and on inside. Head, thorax, and abdomen umber-brown; thorax and abdomen grey beneath.

EARLY STAGES: Unknown to me.

DISTRIBUTION: Has been taken in the Toro district of Uganda (B.M. Coll.), but is evidently very rare. Is not represented in our collections.

DIESTOGYNA THEODOTA, Hulst. Pl. 6, figs. 4 and 9.
(= *cyriaca*, Hulst.; *tricolata*, J. & T.). Pl. 7, figs. 1 and 2.

Mr. Talbot supplies the following description; it is not represented in our collections.

A sombre species, closely allied to *tadema*, Hew.

MALE: Upperside ground-colour paler than in *tadema* or *saphirina*, being a smoky-brown with faint violet tinge; markings pale, more or less slightly violaceous, and often rather obscure. Fore-wing with the usual cell marks and sub-basal line; a post-discal line as in the allied species, its anterior part, to vein 4, at right angles to the costa, its posterior part distinct to vein 1b, straighter and more even and more distinct than in allied species; two submarginal lines as is usual; the proximal area to post-discal line, darker than distal area. Hind-wing with the usual pale costal area and distal area, to discal band, also pale; pale discal line straighter than in *tadema* more as in *saphirina*; post-discal dark spots, and heavy submarginal dark line as in allied species.

Underside: Ground-colour pale reddish-brown to dark reddish-brown; general colouring very similar to that in *saphirina* and *incerta*, Auriv., being unlike *tadema*. Markings exactly as in the two former species.

FEMALE: Only determined by analogy as belonging here. Very similar to *tadema* female. Upperside dull ochraceous-brown. Fore-wing with apical half smoky-brown; a submarginal white band as in *tadema*. Hind-wing as in *tadema*; a discal dark line; a post-discal series of blackish, more or less triangular spots, outwardly edged with paler ochraceous; a submarginal series of blackish spots or bars, separated by the veins, and placed nearer to the post-discal series than to the margin (in *tadema* the spots of the sub-marginal series are usually

sagittate or more or less curved). Underside as in the male, except for the white band on fore-wing.

EARLY STAGES: Unknown.

DISTRIBUTION: Western Uganda, but exact area not known.

DIESTOBYNA ATOSSA, Hew. Pl. 8, figs. 3 and 4.

This species is represented in our collections by a female taken by Carpenter (Bwamba Valley). The male is unrepresented, and we are indebted to Mr. Talbot for the description of that sex.

MALE: Upperside chiefly reddish-brown. Fore-wing with proximal half reddish-brown, distal half black; a post-discal ochraceous band, formed of five spots separated by the veins, the two lower spots, in areas 2 and 3 much larger than the others; four sub-apical white dots, in a curved row above vein 4; a sub-marginal ochraceous line from vein 1b to 5 or 6.

Hind-wing with costal area to vein 7 smoky-brown; an outer smoky-brown border, limited by a submarginal line of small black spots or bars, between which and a post-discal series, is a series of ochraceous spots that bear the submarginal ones; post-discal spots black, triangular, their apices directed inwards.

Underside of fore-wing with posterior ochraceous area, and anterior area deep chocolate-brown broken by pinkish-white cell-bars; post-discal band and sub-marginal line as above; some apical white suffusion. Hind-wing largely reddish-brown, darker than above, and costally deep chocolate; a prominent broad pinkish-white stripe, from base of costa, through areas 7-6 to outer margin; a discal whitish line, angled at lower edge of cell; a post-discal line, produced strongly outwards in area 2, darker brown, edged outwardly with dull white; the area between the discal and post-discal lines is darker than the area between the latter and a submarginal row of blackish triangular spots; a submarginal pinkish-white prominent line, limiting the dark brown outer border which reaches vein 3; anal area more or less grey-white.

FEMALE: This sex is present in our collections and is described as follows:

Upperside: Fore-wing basal half dark orange-brown, distal half black with an extension round the hind angle in the distal portion of 1a and 1b; just here and more internal, the orange is dusted with whitish scales; cell with faint transverse bars toward apex. There is a prominent series of post-discal white spots, small in areas 4-6 and larger in 3 and somewhat arrow-shaped in 2. Three sub-apical white dots set in a curve are present in 5-7, while the apex is also white. Hind-wing mostly

orange-brown, more smoky along the costa and margin; edge of area 7 white; close to the marginal border are ill-defined dark lunulate marks and internal to this series is a further sub-marginal row of angled marks apices directed inward.

Underside: Basal area dull orange paling distally in 1a and 1b; cell crossed by three bars with pinkish-white between; distal portion of wing chocolate brown with the post-discal row of white spots clearly defined, and the sub-apical series also present, but in addition there is a sub-marginal series of whitish pink marks; apex white. Hind-wing as in the male but not so boldly marked.

EARLY STAGES: Unknown.

DISTRIBUTION: Western Uganda, Bwamba Valley; primary forest, 3,000 feet. July, 1921.

EURYPHENE.

GENERAL NOTES ON THE GROUP.

[The great majority of species of this genus are forest insects, but unlike others of this group they are often seen in the openings and clearings. The males are more in evidence than the females for they like to sit in strong sunlight or to chase each other rapidly along paths. I have many times seen males of *Eu. absolon* fighting for a favoured position, beating each other with their wings so that the sound is audible some distance away. Both sexes are attracted to fallen fermenting fruits, and those of a fig tree will collect the Euryphene population for many yards around. Like the *Diestogyna*, they feed with closed wings and because of the procryptic colouration, one can almost tread on them before noticing the presence of a fig or other fruiting tree.—T.H.E.J.]

EURYPHENE ABSOLON ENTEBBIAE, Lathy.

Pl. 10a, figs. 1 and 2. Pl. 11, figs. 1 and 2.

Expanse: Male, 55-56 mm.; female, 60-64 mm. Sexes unlike.

MALE: Upperside: General ground-colour orange-tawny with dark bars. Fore-wing: Orange tawny, slightly paler than hind-wing. Cell with dark wavy lines, the two basal irregularly crescentic, followed by a "B" or 8 shaped mark about the centre, then by a wavy bar, and at the apex of the cell a large oval mark with pale centre. Below the cell is a long dark line at the base of 1b. An almost straight broad bar passes from the hind margin sub-basal in 1a and 1b then through the base of 2 and 3, at right angles to the apical bar of the cell and joins a broad bar beyond the cell. Two other bars composed of contiguous rounded dark spots cross the wing from hind-margin

to costa; the margin of the wing is broadly dark black-brown while the fringe is ochreous. Costa tinged olive.

Hind-wing: Ground colour tawny-orange. Cell with two dark rings centrally and a dark bar apically, this last in contact with a bar which passes through the sub-base of 1c, the base of 2 and 4, and sub-base of 5 and 6; costa dusky; two more or less parallel rows of diffuse, round, large spots cross the wing, the inner one more diffuse and broader than the outer, neither reaching the inner fold. Beyond these is a wavy sub-marginal line from the anal angle to the upper angle; the margin of the wing is dusky, but the fringe is ochreous.

Underside: F.-w.: Ground-colour greyish-ochreous. The dark markings of above are faintly represented by more brownish diffuse bars, the brown colour being most marked as a line from the mid-point of the hind-margin to just below the apex. The sub-marginal row of spots of the upper side is represented by small black dots. Margin of wing brownish. H.-w.: Ground colour as fore-wing, basal area more brownish with an irregular outer margin; cell with two, sometimes three dark rings. A diffuse brownish bar crosses the wing from mid-costa to the anal angle. The outer row of spots above here represented as black dots and the sub-marginal wavy line as a narrow dark line with dots at the angles on each vein. Outer border of wing tinged brownish.

FEMALE: Ground colour olive-ochreous to cream with dark bars. F.-w.: Costa olive; markings as in the male but more brownish-olive, the outer margins of the dark spots being accentuated by creamy irregular bars. H.-w. with a large triangular yellowish to creamy patch base toward upper angle and apex toward inner fold; base of wing olive-greyish with dark spots as in the male. Costa dusky olive-grey, this colour being carried round the marginal border. Internal to this is a wavy submarginal line accentuated internally by a pale ochreous zone. The double row of diffuse dark spots present in the male is here cut short, the inner row being limited to three large and one very small spot proximally in an almost straight line; the outer row ending submarginally in 5.

Underside: Ground colour ochreous grey. F.-w. marks not very clearly defined except those in the cell; the post-discal row of spots here represented as dots. H.-w.: Ground colour as fore-wing, the ochreous triangular patch of above only diffusely indicated but set off by a brownish irregular bar sub-basal in 5 and 6. Cell with three black-brown rings set in a triangle. There is a post-discal row of small dark dots and the sub-marginal wavy line is faintly indicated.

EARLY STAGES: Unknown.

DISTRIBUTION: A common species throughout the forests of Uganda keeping to the undergrowth, and most conspicuous in the clearings and along pathways especially where fallen fruits are to be found. The flight is gliding and the insects keep low to the ground.

[There is much Mullerian mimicry in this group of *Euryphe* centred round *Eu. absolon* as the dominant member. Four other species all less common are closely similar: *laetioides*, *brunhilda*, *oxione squalida*, and *tentyris*.—T.H.E.J.]

EURYPHENE TENTYRIS, Hew. (the nominotypical Western subspecies).

MALE: Upperside ground-colour blackish-brown, the markings ochraceous-brown. Fore-wing with anterior area shot with dark purplish-blue, extending usually to vein 2, the markings in this area dull green. This bluish area is absent from Uganda specimens; in these all the markings are ochraceous-brown, and there is a slight purple sheen over both wings in some specimens. A submarginal contiguous series of six round spots, defined by an ochraceous ring, and decreasing in size anteriorly; a post-discal, slightly irregular line, its anterior part, above vein 4, placed more distad, and posteriorly, this line is directed basad; outside end of cell a bar of variable width, representing the anterior part of a discal band that reaches the cell at origin of vein 3.

Hind-wing markings dull ochraceous, the wing sometimes with very slight purple sheen. A discal narrow band; a post-discal broader band; a submarginal broad band, narrowing anteriorly to vein 7, and bearing five small black spots, the outer edge sharply defined by black, and crenulate. Underside purplish-brown to grey-brown, the markings darker. Fore-wing with post-discal thin wavy line from area 1c to vein 4, and continued anteriorly by a line, more distad, from vein 4 to 8, which has a short projection distad, in areas 4 and 5, and on the distal side is bordered by a somewhat pale bar of greyish-white, more or less distinct; a submarginal row of black dots, each touched with greyish-white on its inner edge; an antemarginal row of blackish dots.

Hind wing with a subcostal, white, somewhat quadrate spot, placed in area 7 a little distad of origin of vein 7; this spot is very prominent, and has a single tooth on its inner edge; thin post-discal line, from inner margin to vein 4, somewhat sagittate; anterior continuation of this line faint, but excurved, and marked by two small pale dark-edged spots in areas 4 and 5; submarginal dark dots as on fore-wing; antemarginal line strongly crenulate.

FEMALE: Very similar to *carshena*, Hew. ♀ on both sides, but hind wing below without a prominent blackish-brown post-discal patch as in *carshena*.

Upperside markings buff-yellow. Fore-wing markings as in male, but a posterior band from vein 2 to inner margin, directed basad on margin, where it ends in a point; the inner edge of this band is formed by the post-discal line, whilst its outer edge is the inner edging of the submarginal black spots. This posterior band is narrower than in *carshena*, and the posterior tornal spot of dark ground-colour is larger than in the allied species.

Hind-wing with discal broad, buff-yellow band that expands towards the apex where it touches the dark submarginal line, which it never does in *carshena*; a post-discal series of six or seven rounded spots, their inner and outer edges defined by buff-yellow; a submarginal, blackish, somewhat crenulate line, placed well away from the margin.

Underside ground-colour much paler than in male, but markings similar and well-defined.

This ssp. distributed from Gold Coast and Togoland to Cameroons, Gaboon, Angola, and Congo.

I am indebted to Mr. Talbot for the above descriptions. The form found in Western Uganda has much less purply sheen on the discs of the wings. Such specimens occur in the Semliki and Bwamba Valley, whereas material from Entebbe and the Budongo taken in June agree with Cameroon specimens in regard to the strong purply sheen. There appears to be no difference between the females from the various areas of its distribution.

DISTRIBUTION: Western Uganda, east to Entebbe. The specimen figured was taken by T. H. E. Jackson at Kamengo.

EURYPHENE TENTYRIS, Hew. Pl. 10, fig. 1.

A single male specimen obtained by T. H. E. Jackson at Kamengo. Other specimens from Uganda in the B.M. The following description is based on Jackson's specimen.

MALE: General colour orange-ochraceous with dull grey-brown markings. Fore-wing ground-colour dull orange-ochraceous; cell with a longitudinal basal mark, followed by a double mark at about mid-point, outlined in black; a narrow transverse wavy line beyond; apex of cell with irregular dark mark set transversely; beyond this a further more diffuse dark mark crossing the sub-base of 4-6; base of 1a and 1b with a dark mark; followed by a sub-basal bar crossing 1b and 2; a post-discal row of somewhat rounder dark marks extends from mid 1a up toward the apex curving slightly in 6 toward the costa; a further sub-

marginal row of decreasing size from 1a extends up to the sub-apex; an ad-marginal wavy line extends from the hind-angle and proximally defines the dark border to the wing.

Hind-wing: Ground-colour as fore but with a slight purple reflection, duller, more greyish along the costa and inner fold. Cell with a sub-basal dark mark outlined in black, and 8-shaped; a band of irregular marks through sub-bases of 6-5 then through the cell, basal in 2, followed by a discal band from upper angle to mid-inner fold, and this, by a post-discal series of more or less triangular marks decreasing in size toward the upper angle; submarginal wavy line commencing at anal angle gradually approximates to and then runs parallel to the margin from 4 to the upper angle.

Underside: Fore- and hind-wing ground-colour pinkish-brown, more ochraceous along hind edge of fore-wing. Cell with marks of above represented by black lines; the other series of dark marks here hardly visible as ill-defined faint bands; the submarginal series represented as black dots, internal to each is a creamy streak. Hind-wing with a conspicuous white mark in 7; the other marks very faint and more or less represented by dark lines; the post-discal, as black dots with ochreous streaks proximally, the submarginal, as faint lunulate marks.

EARLY STAGES: Unknown.

DISTRIBUTION: The species has been taken in the Semliki Valley, Bwamba forest, and at Entebbe and the Budongo Forest. The nominotypical specimens have a strong bluish-purple sheen over the anterior wings and a more purplish sheen on the hind wings. The Entebbe specimens have a purplish sheen on both wings, but some, as in the specimen described, lack almost all trace of the sheen. There is, however, evidence that the eastern examples tend to have less purple sheen than western ones.

No females are available from Uganda.

EURYPHENE CARSHENA, Hew. Pl. 10a, figs. 3-5.
Pl. 11, figs. 3-4.

Expanse: Male, 50 mm.; female, 60-63 mm. Sexes unlike.

MALE: General colour dull satin blue-green with obscure dark marks. F.-w. satin blue-green, inclining to yellow-green along the costa, but the marginal border dull black. Cell marks hardly visible, but there is one blackish spot at the apex of the cell, between veins 5 and 6. There is an indistinct dark bar beyond the cell, and an obscure mark, sub-apical in 6. The submarginal row of dark spots each surrounded by an extension of the green ground colour presents a scalloped and distinctive band.

H.-w.: Ground colour brownish along the front margin and on inner fold; rest of wing with bluish-green as fore-wing. There is a large dark spot, sub-basal in 4 and 5; a post-discal row of spots most distinct in 4 and 5 and represented as lines in 2 and 3, and fading out in 6. There is also a submarginal wavy line, more distinct at the upper angle but more obscure as it approaches the hind-angle. Some of the spots of the underside show through, for the wing has a semi-translucent appearance.

Underside: F.-w. dull ochreous, cell with distinct black-lined irregular marks; a less distinct black-lined mark crosses the discal area and beyond this is a rusty, obscure bar which reaches to the apex of the wing. There is then a series of very small black submarginal dots followed by an indistinct wavy line.

H.-w. ground colour as fore-wing; cell with two black dots and a black ring; the discal area has a dentate black line continuous with a distinct greyish patch outlined in black, sub-basal in 5 and 6. A rusty indistinct bar crosses the post-discal area from the mid-point of the costa to the anal angle. The post-discal row of black spots are small, mere dots, and the submarginal wavy line is black and fine.

FEMALE: Ground colour olive-brown with yellow-ochre bars and lines. This sex bears a superficial resemblance to the female of *Eu. absolom entebbiae*, but it lacks the dark spots of the mid-row in areas 1a and 1b, and the dark areas are not clearly demarcated by the yellow. In the hind-wing the yellow patch is not triangular but is in the form of a bar, whilst the two post-discal dark bands are complete to as far as the inner fold and are distally edged with yellowish ochre. The details of the markings are best seen in the figure.

Underside: Ground colour grey-ochre with a diffuse rusty bar which crosses both wings from the apex of the fore-wing, through the disc of the hind-wing to just above the anal angle. The other marks are as in the male but more diffuse with the exception of the large brownish spot in 5 and 6 (vide plate).

EARLY STAGES: Unknown.

DISTRIBUTION: This is a common species in the forest areas of Uganda being met with in the open glades and forest paths. They fly low with a gliding motion, and like others of the group, are addicted to rotting or fermenting fruits.

[This species prefers the denser parts of the forest where both sexes enter into a mimetic association with the various species of *Diestogyna*.—T.H.E.J.]

EURYPHENE OXIONE SQUALIDA, Talbot. Pl. 10b, figs. 1-4.

The following description has been supplied by Mr. Talbot.

MALE: Upperside with all brown markings dusky; both wings with a purple sheen in a side-light. Underside much darker than in the nominotypical sub-species.

Fore-wing with a discal, a post-discal, and two submarginal lines of dull ochraceous-brown, slightly curved spots, separated by the veins; ground-colour blackish-brown. Hind-wing with four lines similar to those of fore-wing, but straighter and more continuous, and placed at about equal distances apart.

Underside pale reddish-brown. A prominent blackish-brown stripe, extending obliquely from apex of fore-wing to inner margin of hind-wing, and is more heavily marked on hind-wing. Fore-wing with the usual cell marks of the genus; a post-discal, thin brown line, rather irregular, and oblique; a sub-marginal row of six black dots, and a submarginal crenulate line.

Hind-wing with the inner posterior area somewhat ochraceous; cell with three round small rings, the basal one usually a dark dot; two short brown waved post-discal lines, from costa before apex to vein 3; a submarginal row of black dots, and a waved submarginal line.

FEMALE: Upperside similar to other females of this group. Ground-colour deep umber-brown with pale yellowish markings. Fore-wing with four lines as in the male, ochraceous-yellow, more or less dusted with brown. Hind-wing with prominent discal pale yellow band, anteriorly broad, and narrowing strongly to inner margin, its inner edge sharply defined and slightly crenulate; a pale sub-basal bar crossing the cell; a pale post-discal heavy line from vein 4-1b and a similarly coloured sub-marginal heavy line, formed of lunulate marks, edged outwardly with black.

Underside markings as in the male. Ground-colour very pale buff. Fore-wing more or less dusted or shaded with pinkish-brown.

EARLY STAGES: Unknown.

DISTRIBUTION: This species occurs, in my experience, only in the small forest patches around Kampala and is here extremely rare. It is an exact mimic of *Eu. absolon entebbiae*, and can only be distinguished from below.

EURYPHENE BRUNHILDA, Kirby. ? subsp. Pl. 12, figs. 1 & 2.
Pl. 13, figs. 1 & 2.

Expanse: Male, 48 mm.; female, 58 mm. Sexes unlike.

MALE: General colour rich tawny-orange with black spots.
F.-w.: Ground-colour rich tawny-orange; markings very much

as in *Eu. laetitoides*, but more defined, the discal dark marks are angled in areas 2-5; the second row of post-discal spots more circular and clear-cut; the admarginal dark border more distinct. H.-w. rich tawny orange, the discal bar stops at 3; the post-discal inner row of spots, distinct in 7-4 become indistinct in 2 and 3, and the same applies to the outer row. The sub-marginal wavy line is less distinct.

Underside: Ground-colour greyish-tawny with the markings indistinct except for a narrow brownish line which crosses the wing from about the mid-point on the hind margin to near the apex. The distal portion of the wing is shaded with brownish while the second row of post-discal spots only faintly indicated are represented in the apex as white streaks with black centres.

H.-w.: Ground-colour as fore-wing; all marks very faintly indicated, but there is a whitish or greyish bar at about mid-point in 7 and below this a dark brownish spot with diffuse edges; the second row of post-discal spots is only slightly indicated.

FEMALE: General colour bright orange tawny with black tip to f.-w. and with a white sub-apical bar.

F.-w.: Basal half bright orange tawny, distal half brown-black. The cell marks similar to those of the male; the discal row of spots as well as the first post-discal are represented in 1a-2, but the second row or submarginal are clear and outlined with white faintly tinged with violet, in 1b-4, but only represented by white dots toward the apex. A well-marked sub-apical white bar of irregular shape extends to sub-basal in 3.

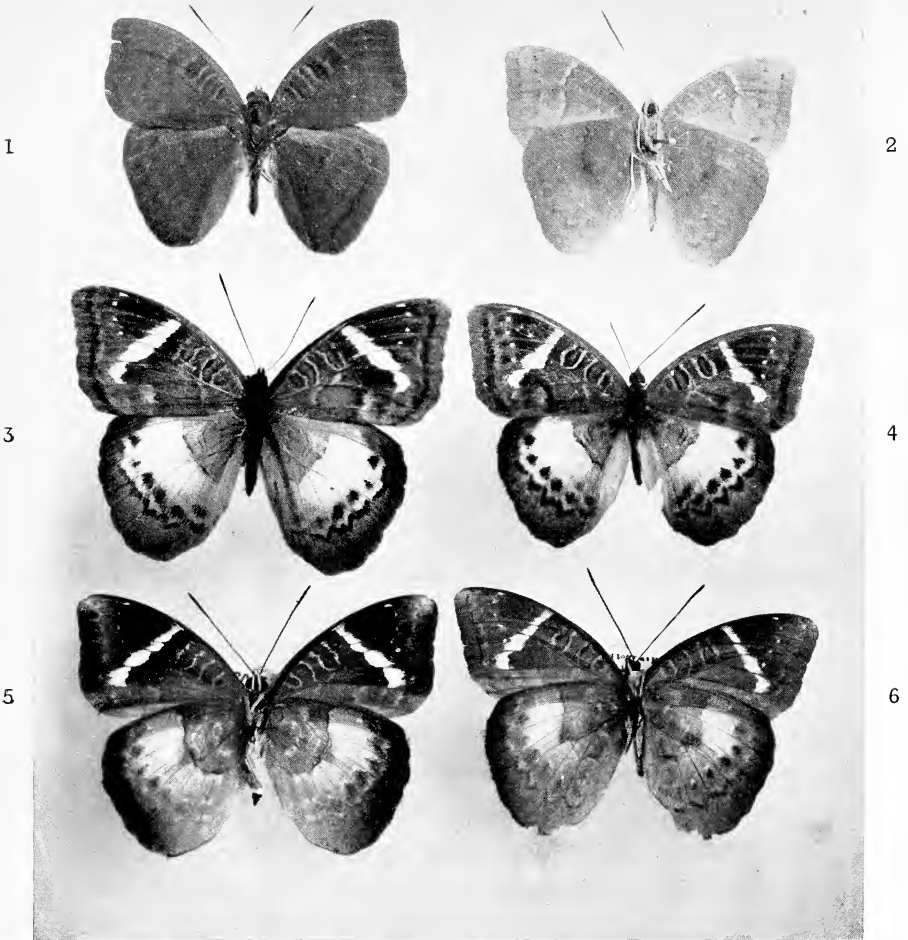
H.-w.: Ground colour tawny-orange; markings as in the male but faintly indicated, the most marked being the sub-marginal wavy line; border of wing dusted with greyish.

Underside: Ground colour greyish-ochreous with a strong pinkish suffusion especially toward the base of the fore-wing and over the greater part of the hind-wing. F.-w. dark marks only faintly indicated but white marks clear, especially the sub-apical bar which has an extension of whitish to pinkish spots running through areas 1b and 2. The apical portion of the wing is suffused with brownish.

H.-w.: All dark marks only faintly indicated, but the sub-costal white mark at about mid 7 is marked and below this are two brownish marks with white centres, sub-basal in 5 and 6.

EARLY STAGES: Unknown.

DISTRIBUTION: Has been taken by T. H. E. Jackson in the Budongo forest in western Uganda and also occurs in the eastern Congo region. It is possible that the Uganda insect represents a race of the typical one of Cameroons. Uganda



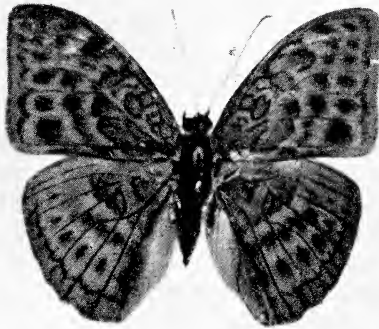
Diestogyna saphirina, Karsch.

Figs. 1 & 2, male, upper and under surface.

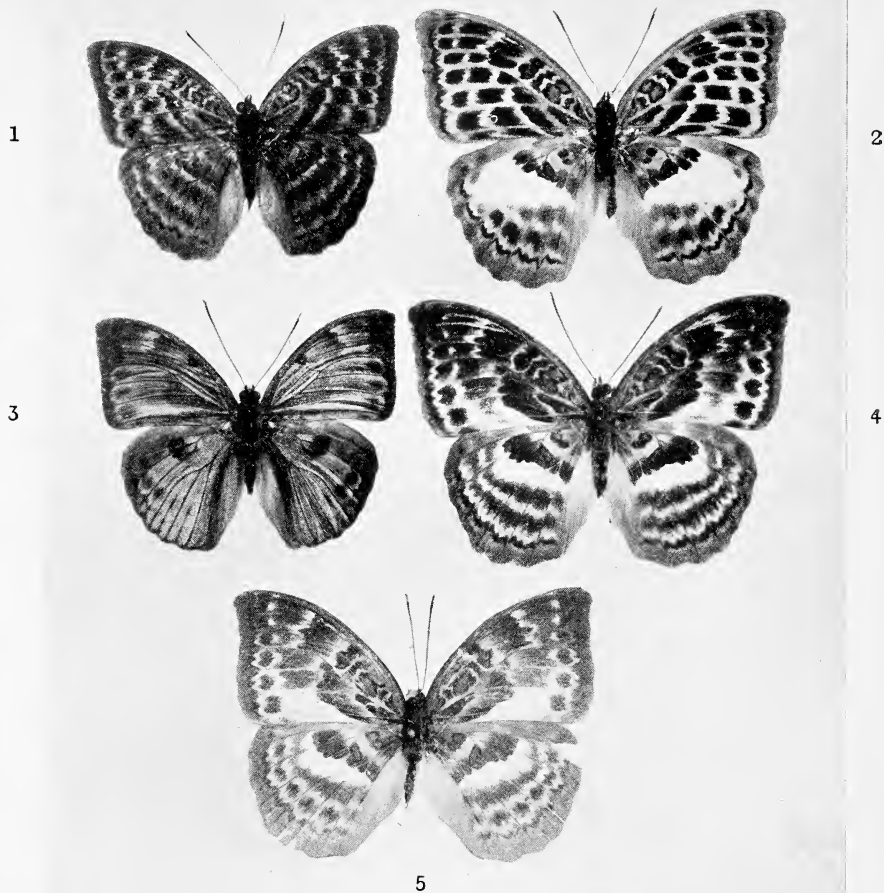
Figs. 3 & 4, female, upper surface.

Figs. 5 & 6, female, under surface.

PLATE 10.



Euryphene tentyris, Hew.
Male (Uganda).

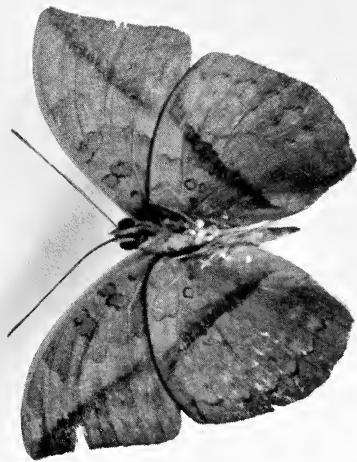


Euryphene absolon entebbiae, Lathy.
Figs. 1 & 2, male and female, upper surfaces.

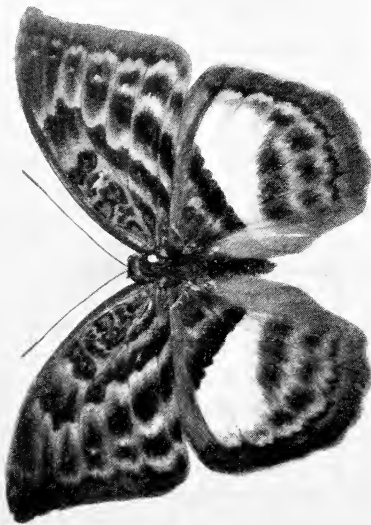
Euryphene carshena, Hewit.
Fig. 3, male, upper surface.
Figs. 4 & 5, female, upper surface.



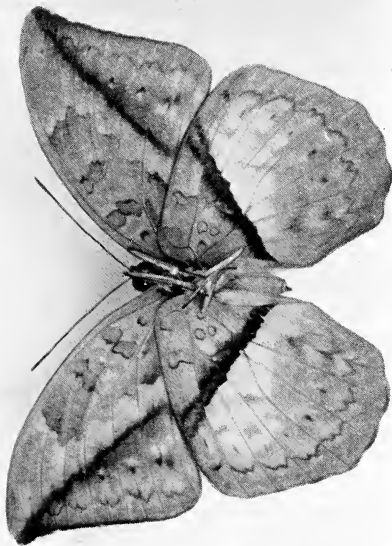
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2



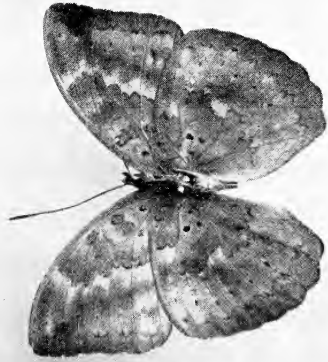
3



4

Euryphene orione squalida, Talbot.
Figs. 1 & 2, male, upper and under surfaces.
Figs. 3 & 4, female, upper and under surfaces.

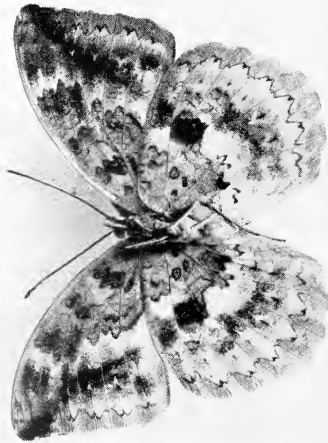
PLATE 11



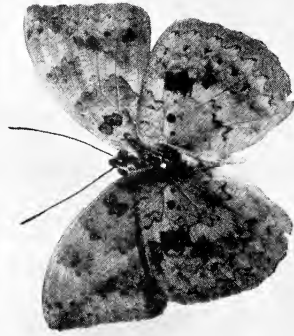
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3



4

Euryphene absolom entebbiae, Lathy. Figs. 1 & 2, male and female undersurfaces.
Euryphene carshena, Hewit. Figs. 3 & 4, female and male under surfaces.

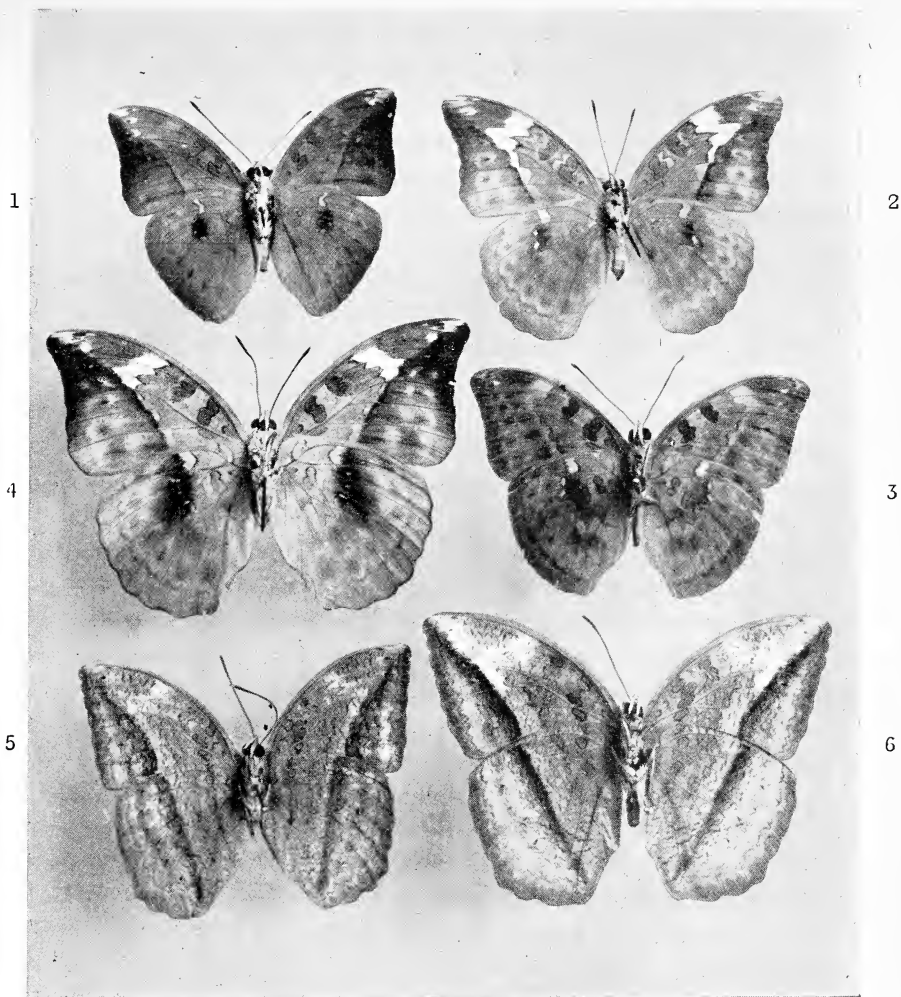


Euryphene brunhilda, Kirby. Figs. 1 & 2, male and female.

Euryphene chriemhilda, Stgr. Figs. 3 and 4, male and female.

Euryphene senegalensis orientis, Karsch.
Figs. 5 & 6, male and female, upper surfaces.

PLATE 13



Euryphene brunhilda, Kirby. Figs. 1 & 2, male & female, under surfaces.
Euryphene chriemhilda, Stgr. Figs. 3 & 4, male & female, under surfaces.

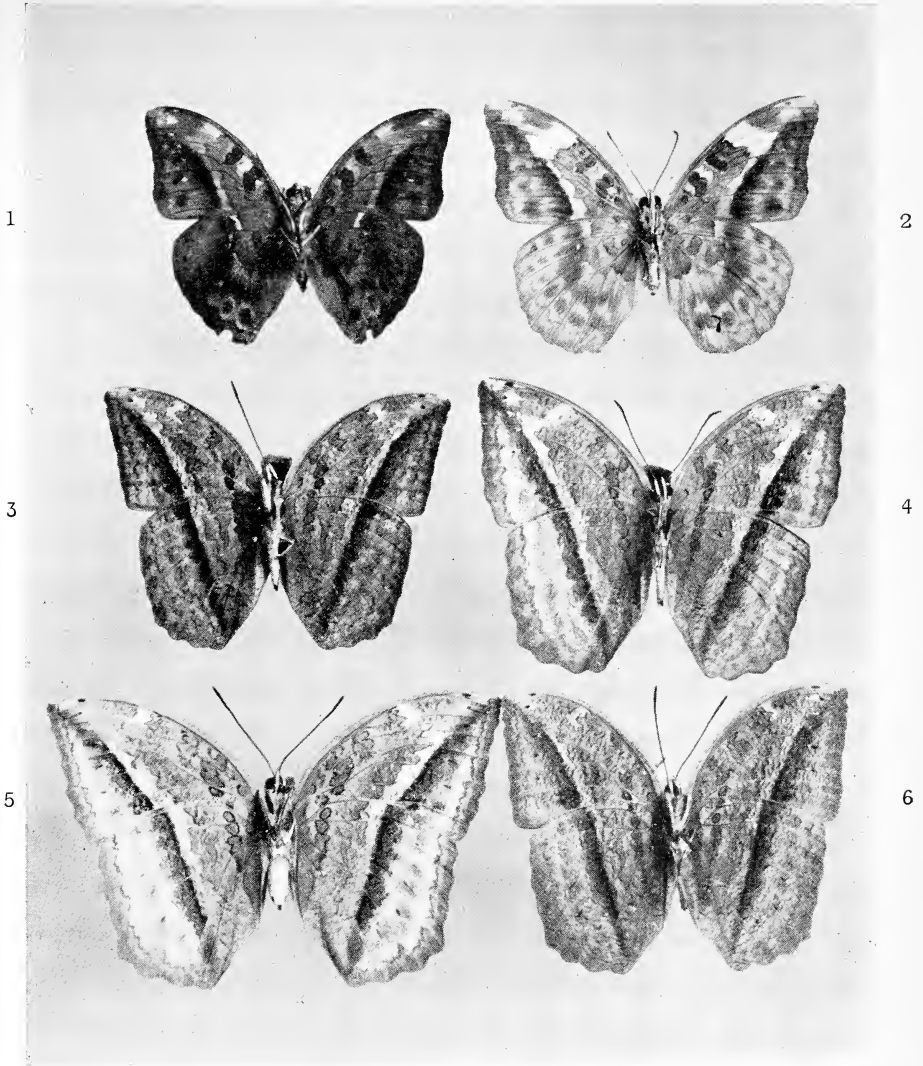
Euryphene senegalensis orientis, Karsch.
Figs. 5 & 6, male and female, under surfaces.

PLATE 14



Euryphene laetitoides, J. & T. Figs. 1 & 2, male and female.
Euryphene mardania katera, van S. Figs. 3 & 4, male and female.
Euryphene mardania badiata, Rebel. Figs. 5 & 6, male and female.
(Upper surfaces.)

PLATE 15



Euryphene laetitoides, J. & T. Figs. 1 & 2, ♂ & ♀, under surfaces.
Euryphene mardania katera, van S. Figs. 3 & 4, ♂ & ♀, under surfaces.
Euryphene mardania badiata, Rebel. Figs. 5 & 6, ♀ & ♂, under surfaces.

specimens are larger than those from the eastern Congo, and are not to be confused with *Eu. iturina*.

The type of *brunhilda* is a female. Uganda specimens differ in having a larger white sub-apical bar in the fore-wing. The discal hind-wing line is more prominent especially anteriorly. On the under-surface the post-discal oblique dark line of the fore-wing is sharply defined not obscure as in the typical form. The hind-wing undersides of both sexes have distinct discal patches.

[I consider this species to be a Mullerian mimic of *Eu. a. entebbiae* in both sexes. It is less common, and on the whole, a weaker flier than *Eu. laetitoides*. Both are to be found wherever figs or other fruits are fermenting on the forest floor.—T.H.E.J.]

EURYPHENE CHRIEMHILDA, Stgr. Pl. 12, figs. 3 & 4.

Pl. 13, figs. 3 & 4.

Expanse: Male, 55 mm.; female, 70 mm. Sexes unlike.

MALE: General colour bright tawny-orange with black spots. F.-w.: Ground colour bright tawny-orange; cell with a basal triangular mark, followed by a narrow transverse line; a central double circle black mark and beyond a faint black line, and at the apex of the cell a broad black bar filling the bases of 4-6; a dusky area at the base of 1b distally margined with black; a discal line of angled spots extends through 1a to 4 then at right angles to the sub-costa in 6; a post-discal row of larger dark spots follows more or less parallel to the discal row and beyond this is a second row of rounded spots which follows the outer margin of the wing. There is an admarginal line following the contour of the wing, and the wing fringe is black.

H.-w.: Ground colour bright tawny-orange, dusky along the costa. Cell with two narrow lined marks; a discal row of black lines is present in 6-4 and only faintly indicated in 3. A post-discal inner row of ill-defined spots is present in 6-2, most clear in 4 and 5, followed by an outer row of spots, largest in 6. The submarginal wavy black line is well defined and narrow.

Underside: Ground colour variable, either strongly bluish violet-grey or tawny with a pinkish-rusty bloom with violet tinge. Spots in cell marked and brownish in colour; a brownish gradually narrowing bar runs between the basal and outer halves of the wing; there is a sub-marginal row of diffuse greyish spots slightly more defined toward the apex where they are outlined with white.

H.-w.: Ground colour as fore-wing with an increase of the violet-rusty tinge toward the centre of the wing. Cell spots clearly defined but submarginal row diffuse though outlined

with the paler ground. The sub-costal mid-spot in 7 is ochreous and this is followed by smaller spots of the same colour sub-basal in 6-4.

FEMALE: General colour bright orange-tawny with black tip to fore-wing and with white sub-apical bar. F.-w.: Basal half bright tawny-orange distal half black; cell marks as in the male, but the bar at the apex submerged in the apical black. Sub-apical white bar present in 4-6; the outer post-discal row of spots outlined in whitish with violet tinge in 2-3, the white being carried toward the apex as dots on either side of the black marks, these dark marks being hidden in the dark surface.

H.-w.: Ground colour tawny-orange, black marks as in the male, but those of the post-discal rows fading out toward the inner margin, and with the submarginal wavy line distinct. The marginal border is slightly dusted over with greyish scales while the costa is dusky.

Underside: F.-w. basal area ochreous, the distal half with an ochreous ground with greyish to brownish shading, the two halves being separated by a narrowing brown line. Cell marks grey-brown, sub-apical bar ending in 4 but apex with a white streak and sub-apical spot. The post-discal outer row of spots ill-defined.

H.-w. ochreous, grey-tinged with a brownish central area sub-basal in 4-6, carrying white spots; sub-costal spot ochreous. Other markings diffuse and only slightly indicated.

EARLY STAGES: The eggs of this species are laid on the leaves of young plants of the doum palm. They also occur on the Borasus palm. They are greenish white with small facets and short spines arising from the angles of the facets. The larvae, at first greyish olive, turn green after the first moult and assume the feathered lateral projections characteristic of the group. At the third and last larval instars the green is finely irrorated with bluish grey. The larva can be reared on the cocoanut palm. The pupa is hardly to be distinguished from that of *E. senegalensis orientis*; the head is less bifid and the dorsal spines shorter. The colour is green with gold at the bases of the spines; the whole surface is glossy.

DISTRIBUTION: The thickets and forests along the Kenya coast, where they keep to the more shaded parts, flying low to the ground. They are easily attracted to fermenting bananas and other fruits.

EURYPHENE SENEGALENSIS ORIENTIS, Karsch.

Pl. 12, figs. 5 and 6. Pl. 13, figs. 5 and 6.

Expanse: Male, 50-56 mm.; female 65-70 mm. Sexes unlike.

MALE: Reddish orange with dark marks and orange spots. F.-w.: Bright orange-tawny with a reddish bloom; cell with

two wavy cross lines toward the base, then three contiguous cross circles, followed by an S line, and at the end of the cell an irregular bar with dark outline. The S line is orange on its proximal side. A discal zigzag line passes from 1b to 3 then turns at right angles up toward the costa but does not touch it. Distal to this line is a more orange diffuse bar becoming more clear-cut toward the sub-apex where it forms a sub-apical bar. The post-discal row of dark spots extend from 1b up toward the apex, and are surrounded by orange, and on the distal edge there is a dark wavy line. The marginal border is slightly darker than the rest of the ground.

H.-w.: Orange-tawny, paler at the inner fold of the wing. There are no marks in the cell, but the discal line is dark and visible through 4-6. The post-discal row of spots which follows the contour of the wing is ringed with orange mostly proximally and beyond this is a wavy dentate line running from the anal angle to the upper angle. The marginal border is slightly dusted over with darker scales.

Underside: Greyish-ochreous on fore and hind-wings. The orange bars of above show through slightly, and internal to the row of small post-discal dark spots there is a freckled brownish bar. The disc of the wing has very fine freckling over the basal half.

H.-w.: This has the same fine freckling in two rows toward the base and across the wing there is a darker bar of brownish fine vermiculations. The post-discal row of spots are small and the submarginal wavy line is faintly marked.

FEMALE: General colour orange-tawny with black apical half and a white sub-apical bar. F.-w. basal area rich tawny-orange, distal half blackish-brown. Cell marks as in the male. The sub-apical white bar extends from the costa to sub-basal in 3, the smallest spot being in 4, thus giving the bar an angled appearance. There is a short discal line with paler orange distally followed by a darker diffuse spot in 1b. The post-discal row of dark spots, double in 1b, here surrounded with orange, is from 2, surrounded with white with a slight violet tinge, the dark marks are then lost in the blackish ground but the white is retained as three spots. The fringe is for the most part dusky but is white in 5, 6, 7.

H.-w.: Basally rich tawny orange, shading to orange over the post-discal area while the marginal border is shaded with brownish scales. There are no marked discal bands, these being indicated by a slightly darker freckling. The post-discal row of spots extends from 7 to 2 mostly as dark short lines, while the sub-marginal wavy line is strongly dentate and defined.

Underside: Greyish-ochreous with fine brownish vermiculations passing through the discs of the wings and distad to this

there is a brownish line of heavier vermiculations which, taking both wings, extends from the apex to the anal angle. The fore-wing sub-apical bar is indicated by a white area, and the white sub-apical spots of above are faintly indicated below.

EARLY STAGES: The common food plant of this species is the coconut palm. The eggs are laid on the leaves of the younger plants usually single, or occasionally in twos or threes. They are creamy in colour with hexagonal facets from the angles of which short spines arise. The larva hatches in seven to ten days and is at first a brownish-olive, but at the first moult turns a brighter green. During the first two instars they feed on the surface layers of the leaves but later on eat the whole leaf structure. The larva is characteristic of this group, having a series of feathery processes from the lateral aspect of all the segments except the last. The dorsal aspect of the 4th and 8th segments are ornamented with a blue patch with a white centre. Pupation takes place in three weeks to a month under favourable conditions. The pupa is much angled, the abdominal segments form an equilateral triangle from the cremaster to the line of the wing-cases when viewed on the ventral surface, the two lateral angles being prolonged into acute spines with golden bases. On the dorsal surface, the second abdominal segment is carried on into a marked spine broadly golden at the base. The thoracic segments and wings form an elongate cone with the head segment strongly bifid. The thorax is ornamented with three lateral and one dorsal golden spot, the lateral ones being along the edge of the wing cases. The pupal period varies from a month to six weeks, though some may carry over for a longer period.

DISTRIBUTION: The species is very common all along the coast, being most plentiful in the coconut shambas and the more open forest along the margins of which doum and borasus palms exist. They are particularly plentiful where the natives have been cutting the husk from the coconuts, the attraction being the fermenting juice from the husk. Males are more in evidence than females and are more readily attracted to bait, such as fermenting fruits of various kinds.

EURYPHENE LAETITOIDES, Joicey and Talbot.

Pl. 14, figs. 1 and 2. Pl. 15, figs. 1 and 2.

Expanse: Male, 50 mm.; female, 58-59 mm. Sexes unlike.

MALE: Ground colour dark tawny-orange with rows of dark spots. F.-w.: Cell with a basal inverted U followed by a transverse narrow line then by a centrally placed double contiguous spot, and beyond this an S-shaped line; just beyond the cell is a dark transverse bar at base of 4 and 5. A narrow line is

present at base of 1b. A discal line of dark more or less elongate spots crosses the wing and turns up at a right angle at 4 toward the costa. A post-discal row of spots, rather indistinct in 1a and 1b, thereafter more distinct passes up toward the apex then turns inward as two long dark lines in 5 and 6 to the costa. A submarginal row of spots starts in 1b and extends to the apex of the wing. The border of the wing has a dark line indistinctly separated from the dark outer edge.

H.-w.: Costa less brownish, more greyish tinged. Cell with two double lines; discal bar distinct in 5-3 and faintly indicated in 2; post-discal contiguous elongate spots more distinct in 5-3 growing faint in 2; a further row is present, distinct and circular in 6-4, then more elongate and less defined to 2 and 3. There is a submarginal wavy dark line following the contour of the wing from the anal angle to the upper angle.

Underside: F.-w. basal half of the wing greyish with a greenish tinge the distal half more brownish, sharply defined along the post-discal line (proximally) and shading off into the ground distally. The cell marks are distinct and grey-brown. The second post-discal row of spots of above are here represented by small whitish dots, that in the apex arrow-shaped and distinct. There is a paler more greyish bar proximal to the brownish bar which becomes whitish just below the costa.

H.-w.: Basal area greenish-grey, distal half more brownish. A greyish elongate streak crosses area 7 and less defined greyish marks in 6-4. There is a series of post-discal greyish ovoid marks with brownish central streaks from 1c-7. Cell marks finely indicated as above. The inner fold of the wing with a slight violet tinge.

FEMALE: Ground colour dull orange-tawny, with white sub-apical bar and indistinct dark spots and lines.

F.-w.: Basal half dull tawny, distal portion dusted with blackish-brown. Markings as in the male, but all more diffuse and indistinct. There are two white sub-apical spots and a well-marked sub-apical white bar which stops at vein 4. The outer post-discal row of dark spots is made more obvious by pale rings round the spots.

H.-w.: Dull tawny, slightly more greyish along the costa. Markings as in the male but all more indistinct.

Underside: Ground colour pale ochreous-grey with in the forewing a brownish shading to the distal half clearly defined proximally. Much of the lighter areas of above are here scaled with white and show up as whitish bars and rings especially in the post-discal areas of the fore and hind-wings. The sub-apical white bar is present and in addition there is a white area toward the apex.

EARLY STAGES: Unknown.

DISTRIBUTION: This species is an inhabitant of the eastern Congo but extends into Uganda, in its western forested areas, and has been taken by T. H. E. Jackson in the Budongo Forest. The male bears a superficial resemblance to the male of *Eu. absolon* but is more rufous, and also to the male of *Eu. brunhilda*, but the dark spotting is not so distinct nor the ground colour so red.

EURYPHENE MARDANIA KATERA, subsp. nov.

Pl. 14, figs. 3 and 4. Pl. 15, figs. 3 and 4.

EURYPHENE MARDANIA BADIATA, Rebel.

Pl. 14, figs. 5 and 6. Pl. 15, figs. 5 and 6.

This species occurs in two racial forms within the Kenya Uganda borders.

Specimens from Katera appear to agree with the Eastern Congo race, unnamed in the British Museum, and to which the name *KATERA* may now be applied.

Expanse: Male, 58-60 mm.; female, 63-65 mm. Sexes unlike. Race *KATERA*: MALE, general colouration dark red-brown with dark and orange marks.

F.-w.: Basal two-thirds red-brown with a strong purple bloom. Cell with ill-defined marks; beyond the cell, a dark irregular bar which is carried down sub-basal in 4 and faintly in 3. Beyond this is a sub-apical orange irregular bar. The post-discal spots are here represented by a row of outer spots encircled by orange, the spot in 1b being faint. Beyond this is a sub-marginal wavy line following the contour of the wing, and the wing fringe is white-spotted in 4-6. Differs from the nominate race in its less broad and less elongate sub-apical orange bar.

H.-w.: Red-brown strongly suffused with purple except along the costa and the inner fold. The discal marks are hardly visible whilst the outer post-discal row is only visible in 5-7; the submarginal wavy line, most evident at the upper angle, fades away toward the hind-angle.

Undersurface: Ochreous grey with a slight greenish tinge, faintly vermiculated. The cell marks are slightly more grey, outlined with brown, while there is a double brownish mark, sub-basal in 1b; this is part of a series which crosses to the hind-wing, passing through the cell. A further dark brownish line consisting of fine vermiculations, more distinct proximally, runs from the apex of the fore-wing to the anal angle of the hind-wing. The post-discal dark spots are here represented as small blackish dots, and the submarginal wavy line is narrow and hardly visible. The surface of the hind-wing is finely vermiculated in more or less parallel series.

Race *BADIATA*, Rebel. In this race, the males are on an average rather larger than *katera*, and are of a generally paler red-brown with far less purple suffusion. The dark marks of the fore-wing are less strong and hardly differentiated from the ground colour. The sub-apical orange irregular fore-wing bar is narrower and less definite, whilst the submarginal wavy lines of fore and hind-wings are ill-defined. The undersurfaces of the two races are very similar, but in the eastern form the markings are less strong and the ground colour is generally paler.

FEMALES: Race *katera*: Ground colour dull reddish-tawny with the apical half of the fore-wing black, this black colour strong and extending from the apex of the cell to almost the hind-angle; all spots within this black area, including the sub-apical bar, white; the admarginal row of black-centred spots white with a violet tinge.

H.-w.: Ground colour dull reddish-tawny slightly greyer along the costa and darker at the base. The only dark markings are a wavy submarginal line following the contour of the wing from the upper angle to the anal angle. The post-discal spots are hardly visible.

The race *katera* differs from the nominate form in its less extensive black to the distal half of the fore-wing and in the absence of the white mark in 1b and submarginal white line in 1a and 1b of the hind angle, and the general different tone to the orange-brown of the disc of the wings; this is duller, less orange.

Type, male: Katera, October, 1935. T. H. E. Jackson.

Paratypes four males.

Type, female: October, 1935. T. H. E. Jackson.

Paratypes three females.

These types will be deposited in the British Museum; paratypes in the Coryndon Museum, Nairobi.

Race *badiata*. In this race the ground colour is less orange, more greyish-tawny; the apical area of the fore-wing is only slightly blackish, and the admarginal row of black-centred spots are ochreous, not white, and not sharply defined. The black of the fore-wing does not reach the apex of the cell. It is altogether paler than *katera*.

Undersurfaces: Greyish-ochreous finely vermiculated, and with the dark lines as in the males already described. The sub-apical white bar is present but more restricted and the submarginal spots are faintly indicated.

DISTRIBUTION: This species is widespread throughout the forests of Uganda and extends into the Kakamega-Kabras area. They are to be found in the more open undergrowth and along

the forest paths exposed to sunlight. The flight is gliding and if disturbed, swift. They are readily attracted to decaying fruit.

[This species prefers hot sunny clearings and the outer fringes of the forest. It has been taken feeding at oozing fermenting sap from trees.—T.H.E.J.]

EURYPHENE PHANTASIELLA SIMULATA, sub.sp. nov.

Pl. 16, figs. 1-4.

Expanse: Male, 53 mm.; female, 60-63 mm. Sexes unlike.

MALE: General colour olive brown with a yellowish fore-wing bar. F.-w.: Ground colour olive-brown; cell with one basal and two dark transverse bars; beyond cell a further dark bar from which, at right angles, a series of discal dark spots extend to the hind-edge of the wing. A marked yellowish sub-apical bar extends from 6-4 and is carried out indistinctly toward the margin but does not reach the edge. Two post-discal rows of faintly indicated dark spots cross the wing, while the marginal border is darker brownish.

H.-w. almost unicolourous olive-brown; the usual marks of this group being very obscured.

Underside: Unicolourous olive-grey, with an obscure darker line from apex of fore-wing to anal angle of hind-wing. The fore-wing sub-apical bar is here white and stops short at vein 5, but there is an apical white tip. In the hind-wing there is an S-shaped white sub-costal mark in 7.

FEMALE: Fore-wing ground colour black with a strong iridescent bluish patch in the mid-areas of 1a and 1b, and slightly at the base of 2. Sub-apical bar white, shaded bluish distally. The disc of the hind-wing is strongly iridescent blue surrounded by blackish along the costa and on the marginal border.

Undersurface strongly greenish as in the male, with the dark marks similarly placed though stronger, and in addition two white spots are present sub-basally in 5 and 6. This female bears a strong resemblance above to *Euphaedra inanoides* but is bluer.

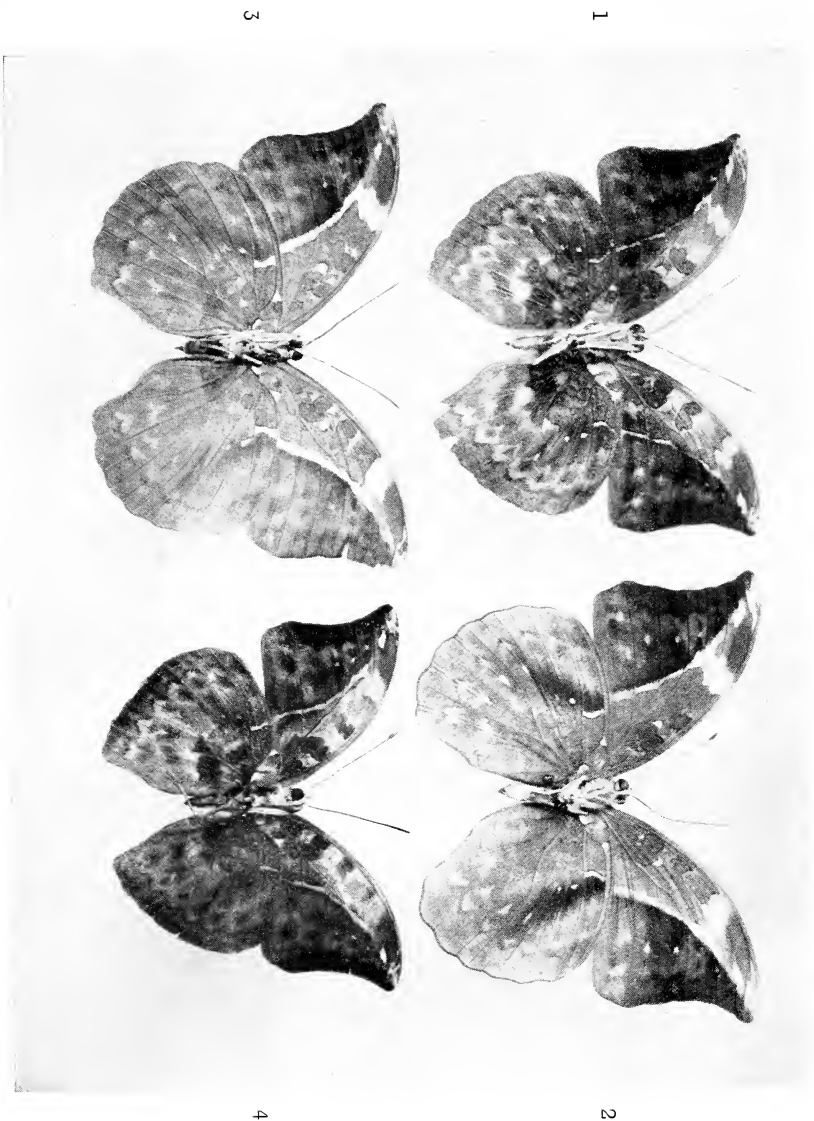
Type, male: Katera, Uganda, T. H. E. Jackson, February, 1939. Paratypes, four males, three females, same data.

EARLY STAGES: Unknown.

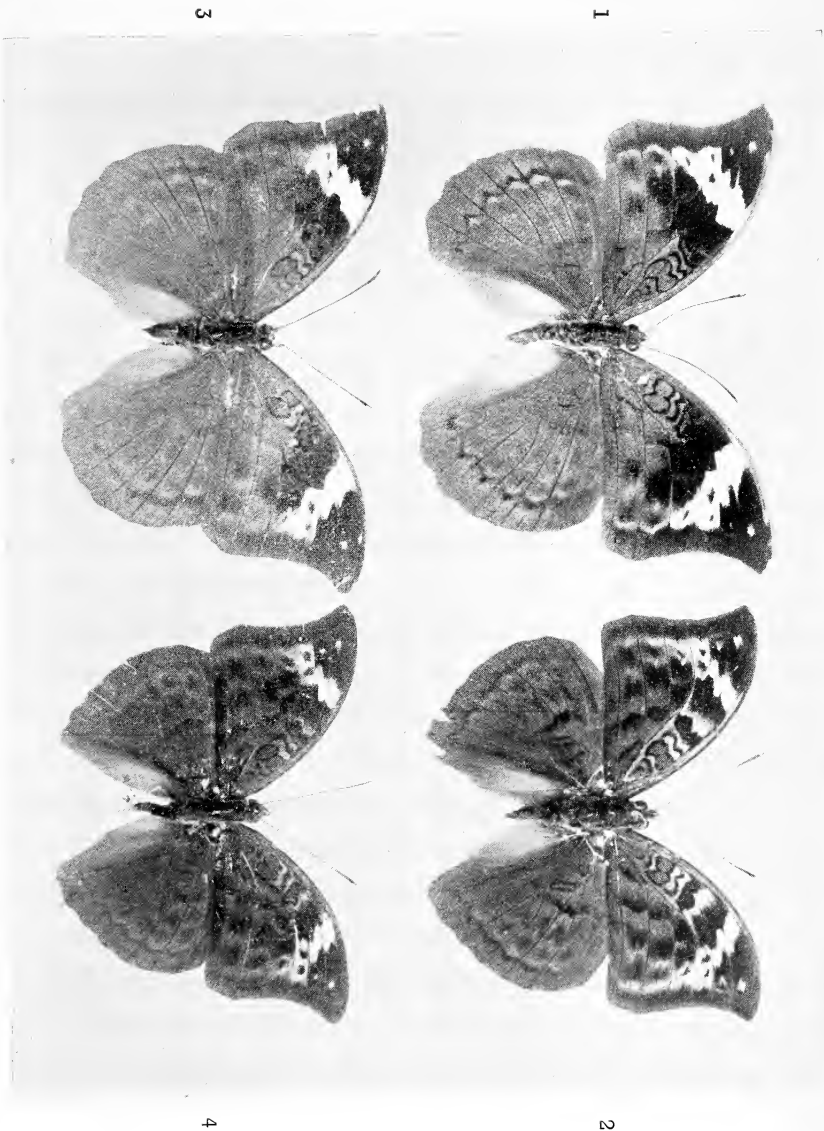
DISTRIBUTION: This eastern race was secured by T. H. E. Jackson in the Katera forest in 1933 and 1939.

The male bears a marked resemblance to *Euphaeda m. fraudata*. Mr. Talbot has supplied the following notes on the specimens described above:

"The male from Katera resembles in the width of the sub-apical band *phantasiella* from Cameroons, but has the patch in



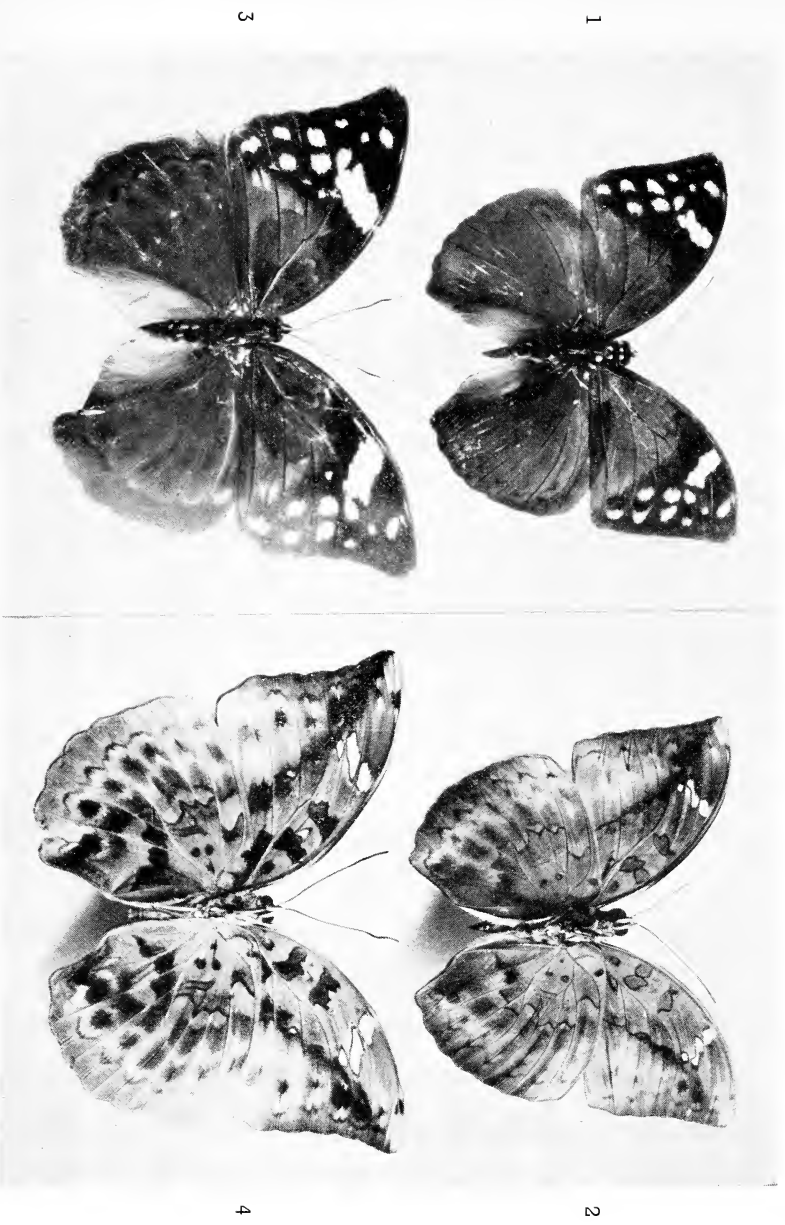
Euryphene sophus (Katera).
Figs. 1 & 2, male and female, under surfaces.
Euryphene sophus audeoudi, Riley.
Figs. 3 & 4, female and male, under surfaces.



Euryphene sophus (Katera).
Figs. 1 & 2, female and male, upper surfaces.

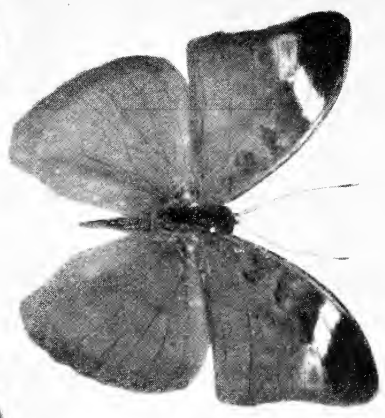
Euryphene sophus audeoudi, Riley.

Figs. 3 & 4 female and male, upper surfaces.

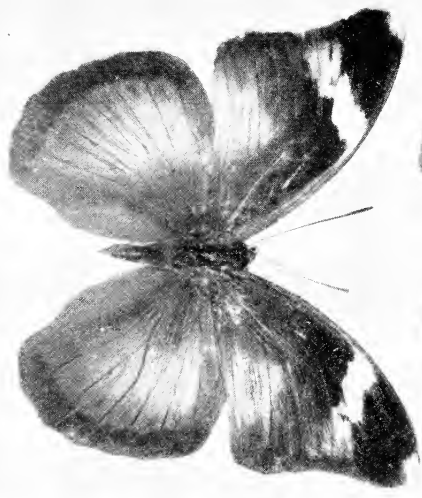


Euryphene pleistonax, Hew.
Figs. 1 & 2, male, upper and under surfaces.
Figs. 3 & 4, female, upper and under surfaces.

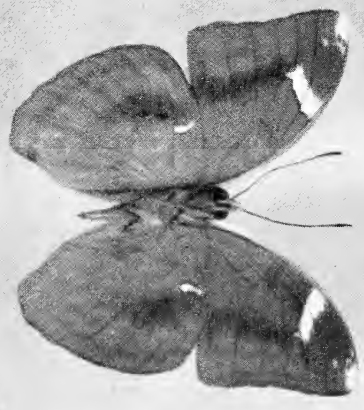
1



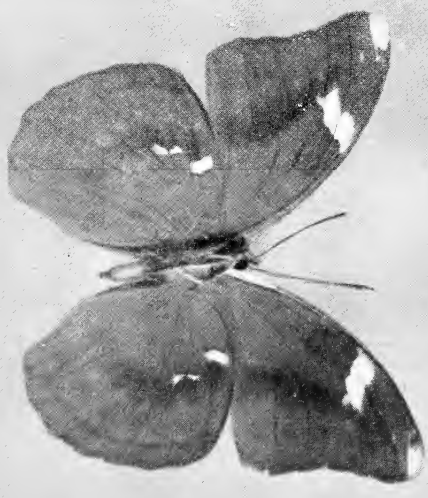
3



2



4



Euryphene phantasia simulata, van. S.

Figs. 1 & 2 female, upper and niter surfaces

area 4 dusted with black as in most specimens of *f. phantasina*. The underside is more pure green than either of the two allied forms which have the green colour more or less washed with greenish-white. Fore-wing with post-discal band straight, not curved as in the two allied forms.

"The female upperside resembles female *phantasia*, but differs in the costal band being white, the part of the band below vein 5 being mostly blue like the inner area of the wing; apical white spot smaller. Hind-wing blue area darker, not paler on the disc and its outer edge is sharply defined. The underside resembles *phantasina*, but fore-wing with wider band; no distal shading over the area between post-discal band and margin. Hind-wing with larger white costal spot and two smaller white spots below it in areas 5 and 6 and placed more distad."

Mr. Talbot also adds the following notes: "*Euryphene phantasiella*, Stgr., and *phantasina*, Stgr. Associated with these two names is another so-called species called *maximiana*, Stgr., 1891, which has a female resembling the male. If the males under these three names were mixed up, one could divide them into a broad and a narrow-banded form and this would not hold good if account were taken of the size of the white apical spot. I suggest that one species exists for the above names, the female being polymorphic.

"If *phantasia*, Hew., is a second species it is distinguished chiefly by the absence of a dark post-discal band on the underside of both wings, this band being always present, on the fore-wing at least of the former species. If the three names given above comprise one species, the oldest name is *maximiana*, but if there are two species, then *phantasiella*, Stgr., 1891, has priority over *phantasina*, Stgr., 1891. Until some proof is forthcoming it may be best to keep the two separate."

EURYPHENE PLEISTONAX, Hew. Pl. 16a, figs. 1-4.

MALE: Upperside of fore-wing with proximal half bright reddish-brown, its outer edge even and oblique from vein 4 or a little above this, to near the tornus; distal area black, extending into upper angle of the cell; a subapical white bar from vein 9-5 and a small spot below vein 5; a post-discal row of five small bluish-white spots in areas 2-6, those in areas 3 and 4 placed more proximal than the others; a submarginal row of similar spots in areas 1b to 6, those in 5 and 6 minute and often absent.

Hind-wing the same colour as proximal half of fore-wing; costal area to vein 7 smoky-brown, this colouring extending often along outer margin to form a well-defined border that is limited by a submarginal somewhat sagittate line.

Underside of both wings with proximal half pale ochraceous; distal half somewhat pinkish-brown shaded with ochraceous. Fore-wing with three sub-costal white spots in areas 4-6, that in 4 rounded; a post-discal, oblique, black, somewhat crenulate line from vein 4 to 1b; a submarginal, obscure, strongly wavy line; two black round spots in areas 4 and 5 near the submarginal line, the lower spot placed more proximad than the other.

Hind-wing with a post-discal black line, very angulate and irregular, from vein 8 to 1a; the whole inner side of post-discal line up to end of cell, usually shaded with black, and also usually a series of obscure black patches outside the line, and separated from the wavy submarginal line by a paler pinkish area, bearing smaller obscure blackish spots.

FEMALE: Upperside resembles the male but brown areas paler. Fore-wing white sub-apical bar wider, and white spots larger. Underside as in male, the markings more distinct.

EARLY STAGES: Unknown to me.

DISTRIBUTION: Western Uganda.

[This magnificent species occurs in dense forest where it is extremely difficult to capture. Its flight is swift and erratic and it is never seen for more than a few seconds. The red colouration of the male is very fine in the sunlight.—T.H.E.J.]

EURYPHENE SOPHUS AUDEOUDI, Riley. Pl. 17, figs. 3 & 4.

Pl. 18, figs. 3 & 4.

EURYPHENE SOPHUS (Katera). Pl. 17, figs. 1 & 2.

Pl. 18, figs. 1 & 2.

Expanse: Male, 53-55 mm; female, 62-65 mm. Sexes unlike.

MALE: General colour olive-brown with yellow fore-wing bar and black spots and bars.

F.-w.: Ground colour olive-brown with a slight reddish tinge. Cell crossed by black lines outlined at apex with ochre; beyond the cell a broad black bar distally set off with a yellow bar; beyond this a broader black bar sub-basal in 4-6, followed by a yellow-ochre sub-apical bar which crosses 6, 5, 4, and extends down the sub-margin of the wing and enclosing diffuse submarginal dark spots. There is a dark line basal in 1b, followed by a discal band of dark spots from 1b to 3, and external to this a further series of three post-discal spots, somewhat quadrate in shape.

H.-w.: Ground colour olive-brown with a reddish tinge over the disc of the wing. Cell crossed by two black line marks; beyond the cell an ill-defined discal black line extending to 3, followed by an angled wavy post-discal line which fades out in 2, and beyond this a series of triangular dark spots, rather obscure and not reaching 1c. The submarginal wavy line is more marked and blacker.

A second common form of male has the ground colour rather more brownish and all the markings are submerged with the exception of the fore-wing sub-apical bar.

Underside: Ground colour mostly violet-grey with an olive-green shading toward the distal half of the fore-wing, this green colour being concentrated as a median band from apex to mid-point in the fore-wing with an extension through the hind-wing from the mid-costa point thence in a curve to the centre of the outer margin and then down the margin to the anal angle. The yellow marks of above are here only slightly indicated but the apex of the fore-wing has an angled white streak. The bases of both fore and hind-wings are darker grey accentuated on the outer margin by a yellow line, to as far as 4 of the hind wing.

FEMALE: Wings even more falcate than male; general colour olive-green with grey bloom, black tip to fore-wing crossed by yellow bar.

F.-w.: Basal half olive green, distal black; cell with black-lined marks; beyond the cell a broad black bar which passes through the basal areas of 5, 4, and 3, and extends into 2 and in 1b is represented by a black spot. Beyond this is a well-defined yellow, broad, sub-apical bar which carries two black spots distally in 4 and is contiguous with and shades into the yellow-green surrounding the sub-marginal dark spots. The marginal border of the wing and the apex is black with a white tip and two white dots.

H.-w.: Mostly olive-grey green, slightly more grey-brown on the costa and inner fold. Discal marks obscure, but the wavy submarginal line distinct from 7 to just above the hind-angle. A variety of female is less green, more olive with the dark marks of the fore-wing obscured.

Underside: Ground colour violet grey with the green-olive shading more distinct and sharply defined. In the fore-wing the sub-apical bar is white where it crosses the grey ground, but brownish where it extends over the green shading. The post-discal row of spots is represented by whitish streaks.

EARLY STAGES: The species lays its eggs on two species of plants, one a wild "rubber vine" *Landolphia*, the other a *Chrysophyllum*. The eggs are greenish with a faceted surface and short spines. The young larva is at first olive, with hardly any indication of the leathery lateral projections, characteristic of the group. At the second moult the larva is green with a pale to whitish centro-dorsal line and on either side, midway between the dorsal line and the lateral projections there is a blue spot present on each segment except the first and last. The feathery projections are bluish green above, whitish below. The pupa is bright green with a highly glazed surface, much angled

at the abdominal segments, especially the dorsal surface, and is ornamented with black spots as follows: one large spot on the thoracic tubercle, one on each of the "shoulders," and two on either side of the wing cases. Most of the tubercles are golden at the base with black tips. The veination of the wing cases is sometimes indicated by darker green lines.

DISTRIBUTION: Occurs sparingly in the eastern forests of Uganda but more plentifully in the central and western forests. It is an insect of the undergrowth, frequenting the more open areas.

[Is common in the Nandi-Kaimosi area, sparingly for some unexplained reason in east and central Uganda, and is then common again in Kalinzu and Ruwenzori.—T.H.E.J.]

EURYPHURA ACHLYS, Hopff. Pl. 19, figs. 1-5.

Expanse: Male, 55 mm.; female, 67 mm. Sexes somewhat alike, but female paler and with more white.

MALE: Ground colour golden-olive or blue-olive green. Cell with two small lines at base, followed by a large black-lined oval mark, then by a thin black line and at its apex a further quadrate mark with a projection into 4. Sub-basal in 1b is a short line; beyond this a discal row of black marks from 1a to sub-basal in 6. A post-discal row, double in 1a to 2 then coalescing and continued as a single row to the apex, the four last often with a white dot placed distad. There is a further series of linear black marks submarginal and following the contour of the wing. The marginal border is blackish.

H.-w.: Ground colour as fore-wing, slightly browner at costa and brownish along the fold. Cell with one black spot at mid-point. The apex of the cell crossed by a black-lined mark; beyond this a short discal series of spots not extending beyond vein 5, followed by two rows of post-discal spots, the outer row more linear, both stopping short of the anal angle. The submarginal dentate line is continuous from the upper angle to the anal angle. The marginal border is narrowly black.

Underside: A rich rusty ochreous, often with a strong violet bloom especially over the basal and discal areas. F.-w.: Markings obscure with the exception of the two large marks in the cell, the four white dots in a line with the apex, and the white tip. H.-w.: Marks in the cell are one circular, one more or less rectangular at apex, and above the cell a further round mark toward base of 6. The post-discal series of spots here represented as white dots and lines. The submarginal line as indistinct greyish-brown with white dots at the veins.

FEMALE: The female occurs in two forms, one very similar to the male except for the greater amount of white on the fore-

wing; the other has a much paler ground colour, more grey-green, so that the lines and spots, similarly placed to those of the male, show up more distinctly. The white markings, conspicuous of the sex, are placed distad to the black discal marks and increase in size toward the costa. The white spots on the post-discal row of black spots are larger, and often number 6.

Underside: Rusty-ochreous with a violet-grey bloom over the base and discs. The dark markings are less obvious than in the male, but the white spots of above are well represented and those of the post-discal series are blackish distally.

EARLY STAGES: The eggs are laid on the young leaves of *Chrysophyllum* sp. They are rounded cones, deeply faceted and from the angles of the facets are glistening spines, 1 mm. long, giving the whole a glinting appearance, though the egg is actually pale green. The larvae emerge in a week to 10 days. At first dull olive, they become green with paler feathery projections, at the second moult. In the fourth stage the dorsum is ornamented with a central white line, and on either side an interrupted blue line. At the base of each of the feathered lateral projections there is a blue spot. The larvae lie along the mid-rib of the leaf with the feathery or fern-like projections in contact with the leaf surface. The outline is then a long oval. The pupa stage is reached within six weeks and the insect emerges in six weeks. The pupa is highly glazed, bright, transparent green with numerous golden spots corresponding to the various spines and tubercles, the most apparent of which are those on the angles of the wings, the "shoulders," that on the second abdominal segment, dorsally, and the thoracic tubercle. The head is strongly bifid, the points being black-tipped.

DISTRIBUTION: The forests along the coast of Kenya more particularly those with damp water courses or heavily shaded ravines. The males can be attracted to bait (fermenting fruits), and are much addicted to settling in a small patch of sunlight, with wings outspread. The females keep more to the undergrowth.

EURYPHURA PLAUTILLA ALBIMARGO, Talbot.

Pls. 20-21, figs. 1-16. Pl. 22, figs. 1-4.

(*E. isuka*, Stoneham, equals male of *albimargo*, Talbot, thus a synonym.)

I have been at considerable pains to discover what is the correct designation for the race of *E. plautilla* inhabiting the eastern Belgian Congo east to Uganda and Kakamega in Kenya.

Consulting the literature, we find that the first name to be applied to any form or sex of this eastern race is that of Talbot, Bulletin Hill Museum, Vol. 1, 1921 (figured Pl. XI), p. 63, in

which a female is described as *albimargo*, f.nov. (type loc. Ituri Forest). Subsequently, Stoneham described a male and female from Kakamega as *isuka* and *ithako* respectively, Bulletin Stoneham Museum No. 25, Oct., 1935, describing the male as a species, though admitting that it might possibly "be considered a race" of *plautilla*.

Examining a long series of males from Eastern Congo to Kenya, we find that there is no constant difference between them, and that the characters on which Stoneham founded his *isuka* were to be found in western Uganda examples. Mr. Talbot, examining the series in the British Museum, has come to the same conclusion. Following the accepted procedure, of raising a form name to rank as sub-specific, and with the full concurrence of workers in the Entomological Department of the B.M. I have accepted Talbot's name *albimargo* as that which is applicable. I have adopted this procedure, although I am given to understand that the International Rules of Nomenclature do not give cognisance to names below sub-specific rank. It is, however, a recognised common procedure and practice.

It will thus be noted that although *albimargo* is now applied as the racial name for the eastern sub-species, it is still also retained as the form name of those females answering to the description of the type cited by Talbot. I have been guided in this by those in authority in the British Museum. In dealing with the several female forms, I have taken cognisance of the fact that although very similar forms are associated with the nominotypical *E. plautilla plautilla*, and have been designated by form names, these names cannot be applied to somewhat similar females of the eastern race, and I have thus adopted the system of adding a prefix to the names of those forms of the western race as have been described, and have retained certain names which have been applied to female forms of the eastern race. Thus *ithako*, Stoneham, is retained for the forms with a continuous white band in the fore-wing.

Expanse: Male, 50 mm.; female, variable but average about 53-55 m.m. Sexes unlike.

MALE: General colour dull bronzy brown with darker brown markings; anal angle produced to form a "tail."

F.-w.: Ground colour dull brown. Cell with two small marks toward base, one large black line mark just beyond middle, and a thin dark line beyond. At the bases of 4 and 5 a further broad black-outlined mark with a projection into 4. Bases of 1a and 1b shaded dark, beyond this a discal series of dark brown spots which carry on more or less at right angles to the costa through 4, 5, 6. There is a post-discal double row in 1b to 2, continued forward to just short of the apex as a single

row, white inwardly, black distally, the largest white spot being in 4. A submarginal interrupted zigzag line follows the contour of the wing up to the apex.

H.-w.: Ground colour dull brown, paler along the inner fold. Base of wing dusky over most of the cell, this with one circular spot at mid-point and a further more rectangular lined mark at apex. There is then a short series of discal spots stopping short at 2. Beyond this is a row of post-discal triangular dark marks and a second row of circular spots set in curves to follow the wing contour, and running parallel to this is the submarginal zigzag line from upper angle to anal angle.

Underside: The ground colour of both wings is dull ochreous to buff with a rusty area over the incised portion of the fore-wing and over the anal half of the hind-wing. The markings of the fore-wing are two large black-lined grey marks in the cell and just beyond; while the post-discal row of spots, black to black and white, are present from 1b to just within the apex. The hind-wing marks are: two in the cell and a circular mark just above. The other markings are obscured but the post-discal row of spots are edged internally with white and joined up to the submarginal series by white lines; the anal angle has a double violet-tinged line.

FEMALE: Variable; occurs in several forms. Pls. 20, 21, 22.

A. This is a form which is somewhat male-like in that the general colour is brownish but not so dark as the male. Ground colour grey-brown with the upper marks as in the male but showing up more clearly on the paler ground. In addition the discal series of angled marks are more pronounced and are distally bordered with white whilst there are long angled white marks in 4, 5, 6, forming an irregular sub-apical bar. The post-discal series of dark spots are accentuated on their inner side in 3-7 with white.

In the hind-wing the basal area is darker, defined on its outer edge by a curved series of angled marks; beyond this the discal zone is paler, and crossed by a double series of post-discal marks, more diffuse arrow marks internally, followed by more defined triangular dark marks outlined with a paler brownish; and distal to this is a submarginal wavy zigzag line.

Underside: This is best described as rusty-ochreous slightly paler on the hind-margin of the fore-wing and violet greyish toward the apex at sub-costa. The hind-wing also rusty-ochreous, paler at the upper angle and tinged with greyish below the cell. The f.-w. cell has two black-lined dark grey marks, and beyond some greyish shading, while the discal marks are angled dark brown and greyish; the

post-discal row of spots are white with black centres. The h.-w. cell marks are similar to those of the male, but the discal zigzag line is brownish outlined and accentuated with whitish.

Type: Budongo, April, 1936 (Jackson); paratypes 3. Budongo, June, 1936 (Jackson). = neo-albofasciata f.f. nov. Pl. 21, fig. 10.

- A1. A variation in which the ground colour is paler, more rusty to pinkish especially over the discs of both wings so that the spots and marks in this area show up more. There is, however, no, or hardly any indication of the white angular marks in the fore-wing.

Type: Jinja, July, 1928 (van Someren); paratypes 4. June-July, 1928 (van Someren); 1, Kakamega (T. H. E. Jackson), 1933; 1, Katera (Jackson), Nov., 1935. = conformis f.f. nov. Pl. 20, fig. 8.

- A2. A variation of above with the fore-wing whitish marks more apparent, and in addition there is a distinct greenish tinge to the surround of the outer post-discal dark spots especially in areas 1b and 2 of the fore-wing and toward the hind angle of the hind-wing. This is an important transitional form toward B. Pl. 20, fig. 7.

- B. Broadly speaking, this form might easily be mistaken for the female of *Euryphura achlys*, the ground colour is the same greyish-olive with a golden or brassy sheen in some lights. In the fore-wing the white angled marks are present especially in areas 3-6 and the post-discal series of dark dots are white tipped. The dark markings of the cell and those of the hind-wing show up distinctly on the greenish ground.

Type: Budongo, Nov., 1937 (T. H. E. Jackson). Paratype 1 same date. = neo-oliva f.f. nov. Pl. 20, fig. 5.

- B1. A variation of above, in which the ground colour is less green, more greyish particularly over the disc of the fore-wing and the surround of the post-discal row of spots in the hind-wing. There is furthermore a distinct ochreous tinge to the discal zone of the hind-wing, whilst the basal area is thus sharply defined and darker. In the fore-wing the whitish areas are wider, and there is a whitish shading toward the apex of the cell and beyond so that the double cross-bars here and in the cell show up more distinctly. This variety is thus a further development of A2 toward B, with an approach toward C described hereafter. Pl. 20, fig. 6.

- C. A very pale form in which the predominant colour is white. F.-w. basal area of cell, bases of 1a-5 greyish-brown, this area bordered and accentuated distally by a series of darker

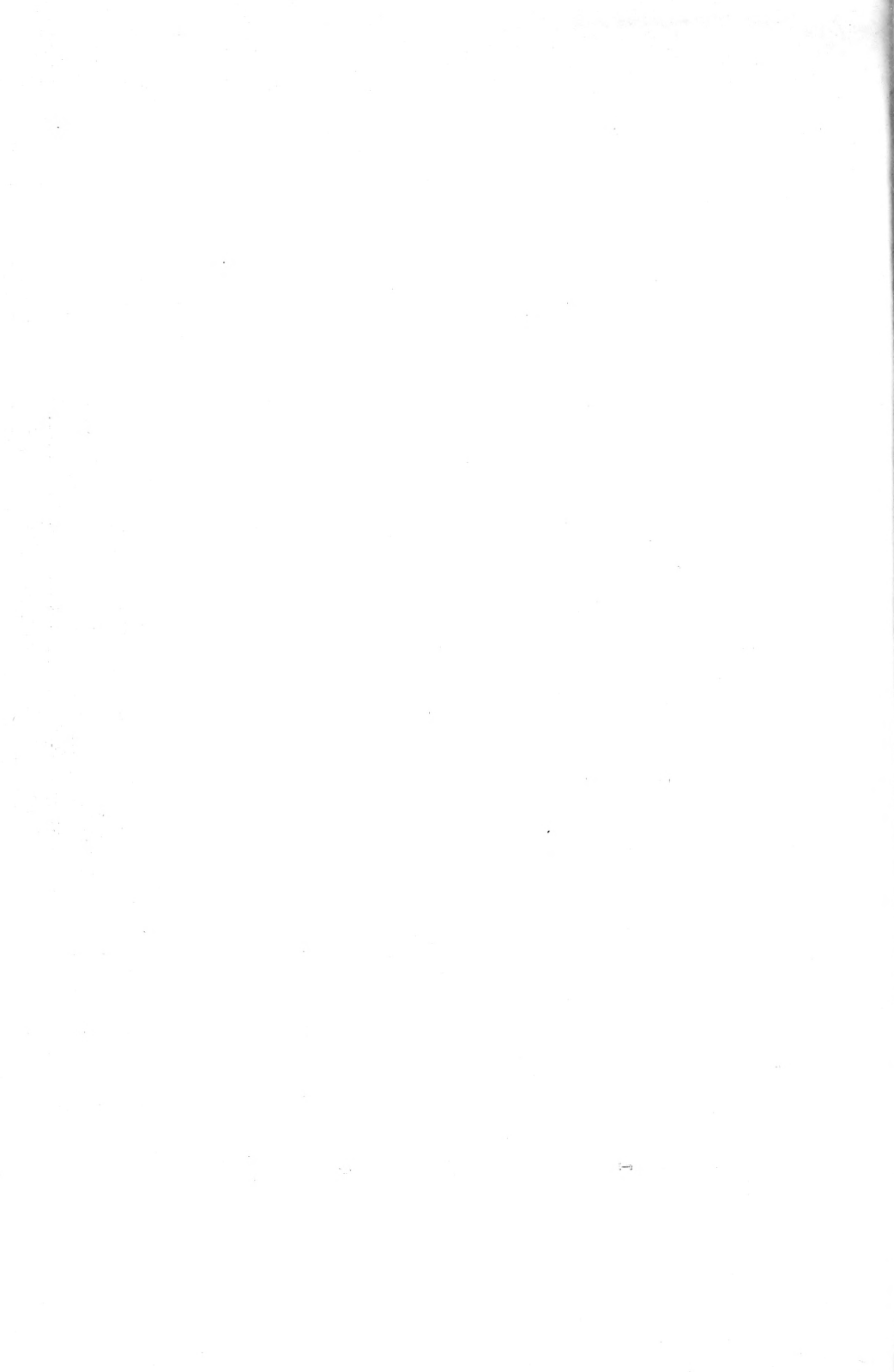


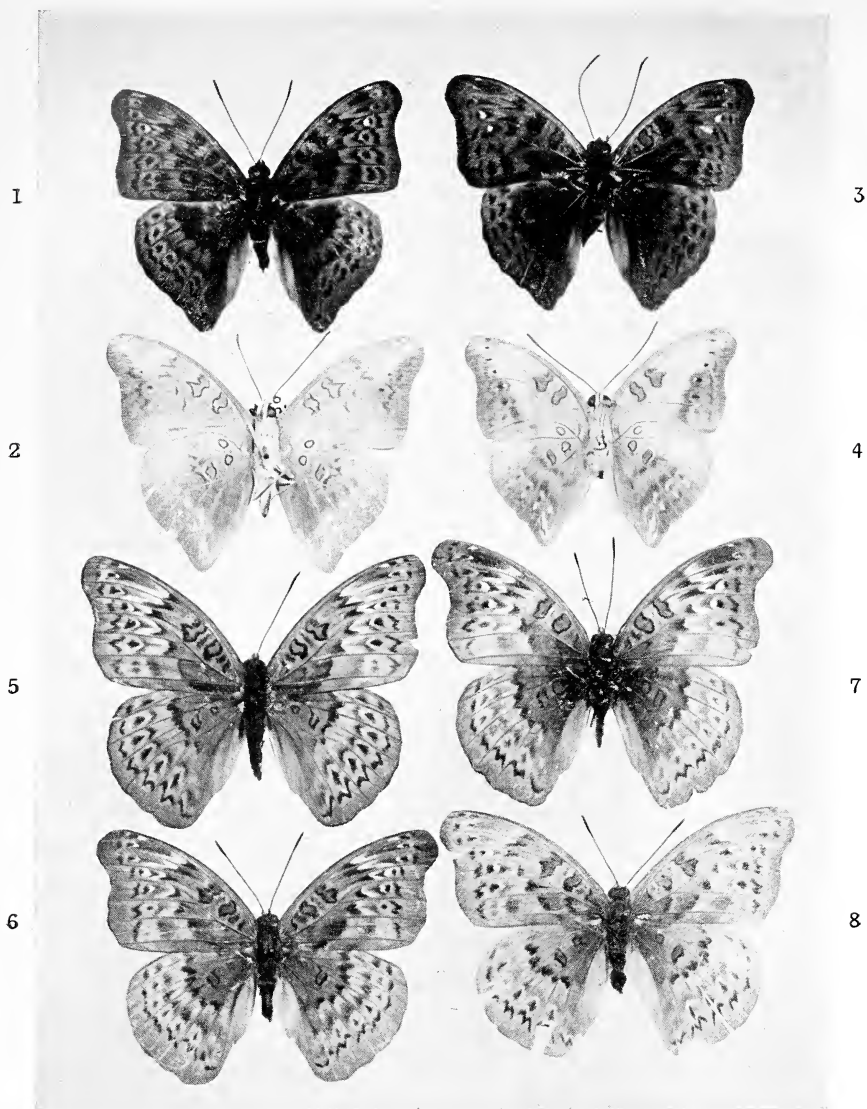
Euryphura achlys, Hopff.

Figs. 1 & 2, male, upper and under surfaces.

Fig. 3, variety of female (male-like).

Figs. 4 & 5, female, upper and under surfaces.





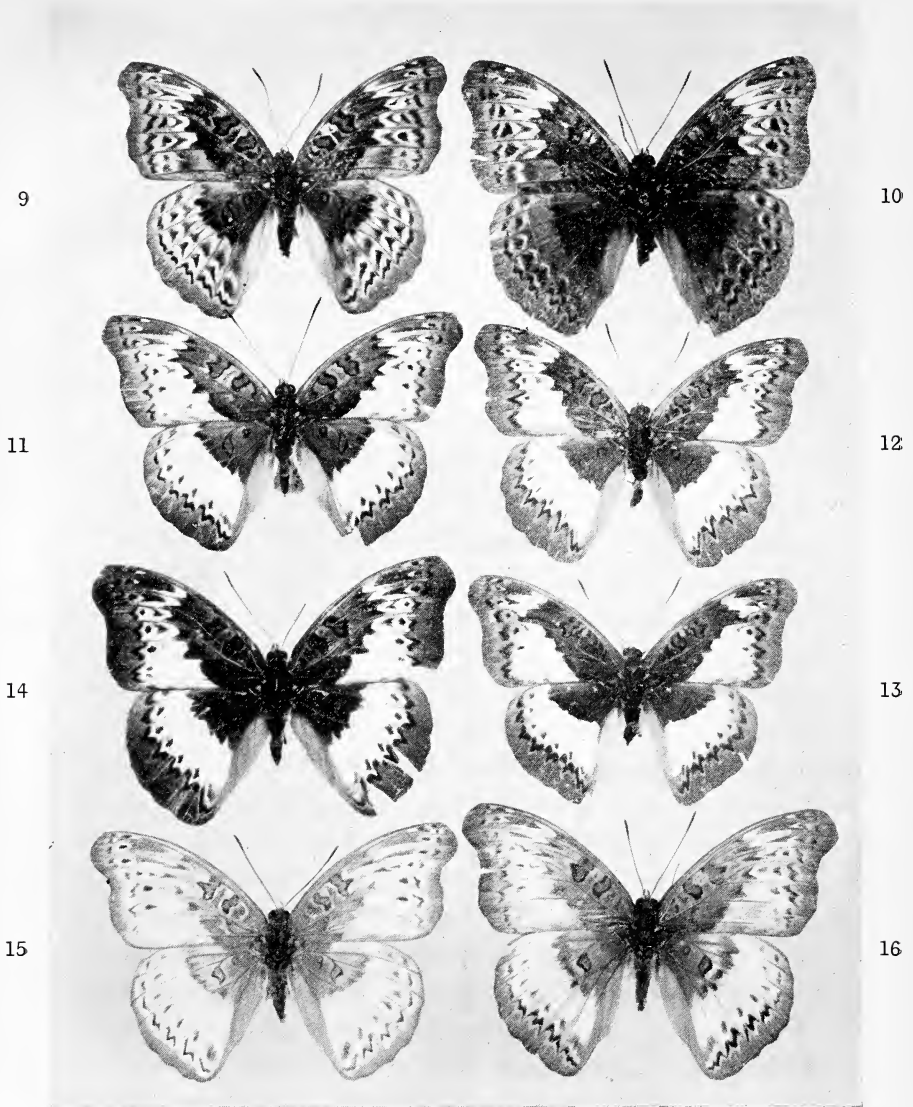
Euryphura plautilla albimargo, Talbot.

Figs. 1-3, males (Uganda), upper and under surfaces.

Fig. 4, male (Kakemega), under surface.

Figs. 5 & 6, f.f. *neo-oliva*, van S. (green forms).

Figs. 7 & 8, f.f. *conformis*, van S. (brown forms).



Euryhura plautilla albimargo, Talbot. Female forms.

Fig. 9 (brown form), *conformis* X *neo-albofasciata*.

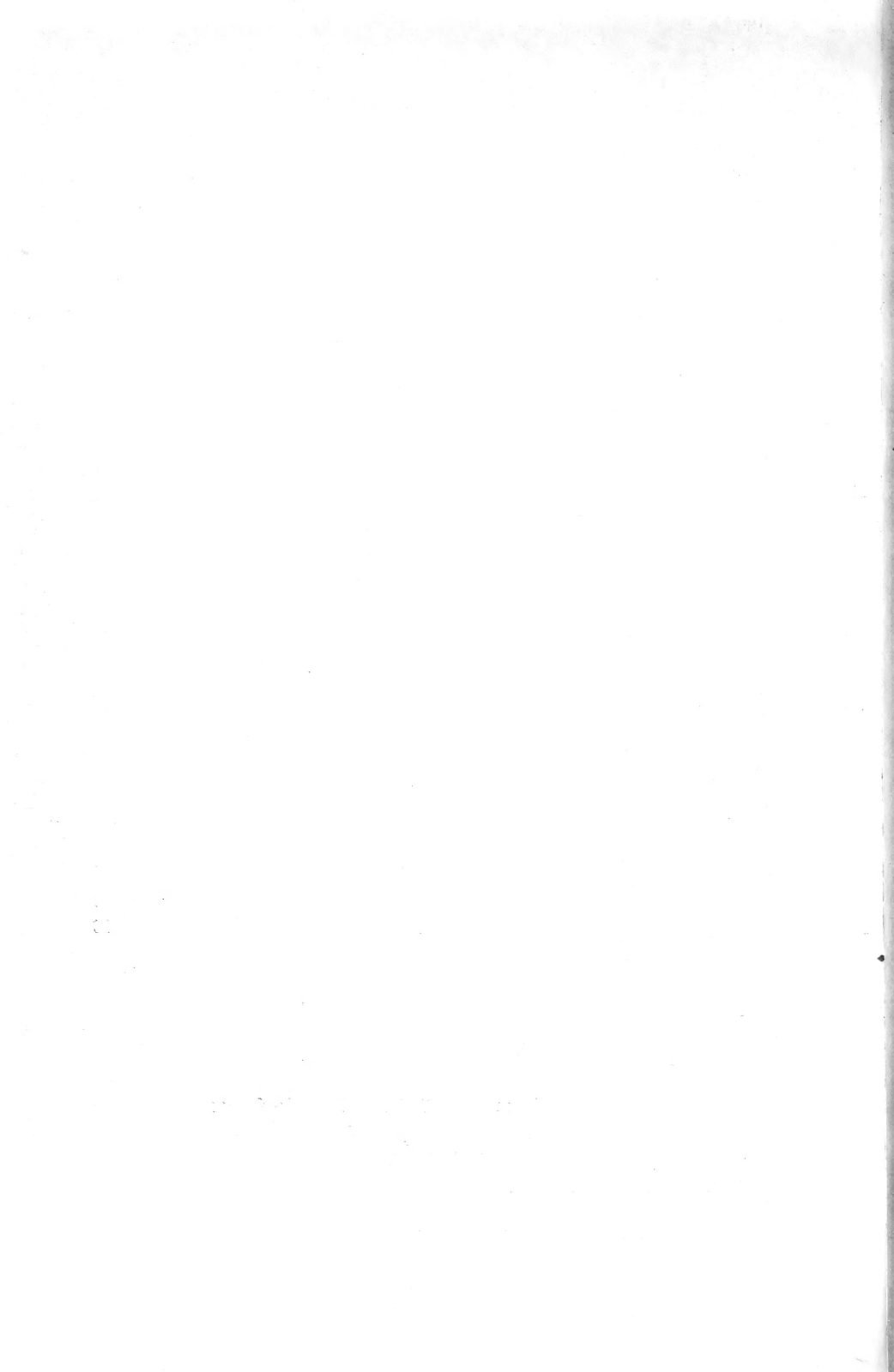
Fig. 10, f. *neo-albofasciata*, van S.

Figs. 11 & 12, f. *ithako*, Stoneham.

Fig. 13, f. *neo-athymoides*, van S.

Fig. 14, f. *bicolor*, van S.

Figs. 15 & 16, *albimargo*, Talbot.



spots and arrow marks in a line from sub-base in 1a-4 thence in an angle toward the costa in 5 and 6. Beyond this the disc is white extending toward the hind-angle and crossed by a diffuse indistinct inner and a more distinct darker outer, series of post-discal marks, and beyond by a sub-marginal broken series of wavy dark marks, the border of the wing being brownish-grey especially toward the apex which carries a further series of four dark spots following the contour of the tip. These spots as well as the upper of the submarginal series are whitish proximally. The fore-wing cell is crossed by three dark-lined bars, and beyond its apex is a dark-lined hastate mark outlined with white. The hind-wing basal area is grey-brown filling the cell and bases of 1a-2 and 8; this dark area shades off to white at the bases of 4-7 and beyond is crossed by a curved dentate line from mid-costa to apex of cell and on to the inner margin. Beyond, the wing is broadly white to almost the border which is narrowly brownish at the upper angle gradually widening toward the hind-angle. This white area is crossed by an inner row of ill-defined arrow brownish marks and an outer series of graduated spots, then by a submarginal zigzag line from upper angle to anal angle. The inner fold of the wing is grey-brown. This type of female may be known as f.f. *albimargo*, Joicey and Talbot. Pl. 21, fig. 15.

- C1. is a variety of *C* in which the basal brownish areas are darker with little white just beyond the fore-wing cell, with only a greyish shading above and beyond the hind-wing cell; with the discal row of dark spots in less of a curve but stronger, so that between this and the broader marginal dark border, the white band shows up more distinctly. Furthermore the submarginal zigzag line is wider and darker. There is a distinct green sheen to the area beyond the cell. In the fore-wing the dark border is wider and extends so as to almost include the series of dark sub-marginal spots which are only slightly outlined with white. There is evidence in this variety of the B1 greenish colouration; it however is a variant of *albimargo*. Pl. 21, fig. 16.
- C2. This is a variation of C 1 in which the basal dark areas as well as the borders to fore and hind-wings are darker, more blackish-brown; the basal dark areas being sharply defined distally and strongly dentate. The apical black and the border of the fore-wing and the dark border of the hind-wing reach up to and include the submarginal zigzag row of lines. The outer row of post-discal arrow marks are still within the white band, whilst the inner row is only faintly indicated. = *ithako*, Stoneham. Pl. 21, figs. 11 and 12.

- D. In which the dark areas can be termed black-brown contrasting strongly with the discal pure white band on fore and hind-wings. The outer row of post-discal spots are blacker and more definite and there is a reduction in the V-shaped white at the sub-bases of 5 and 6 in the fore-wing. There is a distinct violet sheen to areas 1a and 1b in fore-wing and 4 and 5 of hind-wing. = *bicolor* f.f. nov. Pl. 21, fig. 14. Type: Budongo, June, 1936 (T. H. E. Jackson).
- D1. In this form, the distinguishing feature is the great reduction or absence of any white spot in the f.-w. bar in 4, so that this bar is separate from the sub-apical white bar, which is itself almost at right angles to the wing band. This form, which is common, and though showing, as these several forms do, intergrades amongst themselves, may be known as *neo-athymoides* f.f. nov. Pl. 21, fig. 13.

Type: Kampala, Jan., 1935 (T. H. E. Jackson). Paratypes 7. Kakamega, Oct., 1930, Sept., 1937 (T. H. E. Jackson); Jinja, May, 1923; Mulange, Oct., 1921; Kakamega, Feb., 1932 (van Someren).

The brown-black beyond the f.-w. cell thus extends and meets the dark marginal border.

In view of the variation in the females as indicated above, it is suggestive that this species is closely related to, if not actually conspecific with *achlys*. Indeed, Holland, in reporting on the Lepidoptera taken by the American Expedition to the Congo, *Bull. American Mus.*, Vol. XLIII, p. 193, records a female taken as *achlys*, Hopff. and states that it agrees with examples of that species from Zanzibar! Examination of the genitalia, in wet and dry preparations, indicates a remarkably close affinity in *achlys* and *plautilla*, there being just that slight difference, though not by any means constant, which might be expected in two races of the same species. The general facies of the genital armature in both is the same, and the variation in the number and position of the spines on the penis is present in both. As, however, the relationship of these two to *chalcis* is in doubt, I record them as species, with the above proviso.

EARLY STAGES: I am indebted to Miss Fountaine for information regarding the early stages of this insect. "Found very commonly on a low-growing creeper, a species of wild rubber, in the more shady parts of the Kibale Forest. Unfortunately out of more than two dozen larvae found on this plant, every single one was parasitised. Other larvae taken on *Chrysophyllum albidum* had escaped parasitism and finally produced butterflies. The full-grown larva is green with a distinct white dorsal line, on either side of which, on each segment, is a small

distinct blue spot. The head is green, and the first segment carries two long branched horns of the same colour. On the lateral aspect of all the other segments are fairly long feathery appendages, paler green in colour, with a slight bluish tinge.

"The pupa is bright green with black spots on the abdominal spiracles and thoracic tubercles."

DISTRIBUTION: This species has been taken in greatest numbers in the forests of western Uganda, but extends east to the Kakamega and Kabras forests in Kavirondo. It is very plentiful in Katera, Kibale, Budongo.

The female form *albimargo*, Talbot, bears a strong resemblance to the female of *Cymothoe s. hobarti* and to a lesser degree with the white female form of *Harma theobene*. There is also a resemblance between the form D, *bicolor*, and the black and white females of *Cy h. johnstoni*.

[Both sexes of this species may be taken, wherever they occur, on fallen fruits. They fly low along forest paths and roads, settling every now and then to feed for a few moments with closed wings, when they become practically invisible.—T.H.E.J.]

CYMOTHOE SANGARIS HOBARTI, Btlr. Pl. 23, figs. 1-6.

Expanse: Male, 50-52 mm.; female, 58 mm. Sexes unlike.

MALE: General colour bright red. F.-w.: Bright red except for the apex and the extreme margin which are black. Some specimens have very small black dots sub-marginally, the one usually present being in 6. H.-w.: Bright red with the fold of the wing ochre-grey; the extreme margin is black and there is a submarginal row of black spots, those toward the anal angle sometimes being joined by fine black angled lines. There is often a dull blackish spot below the costa in 7.

Underside: Rusty-ochreous with a rusty line crossing the hind-wing from just above the anal angle to about the mid-point on the costa and thence to the fore-wing to the root of vein 7. The submarginal and post-discal marks are obscured, but two black-lined marks are present in and just beyond the cell and at the base of 1b. In the hind-wing there are two black-lined marks in the cell and a broken wavy black line through the disc. The post-discal dots are greyish-white whilst the fringe carries white dots in the interspaces.

FEMALE: Mostly white with a dusky suffusion over the bases of both wings and on the margins and apex of fore-wing. Both wings are crossed by a median dark line. F.-w. cell with wavy black lines and white interspaces beyond root of vein 2. Beyond the cell two further lines followed by a wide white bar. The apex and margin broadly dusky and internal to this two

series of arrow-head marks; in some specimens the outer marks are joined. Sometimes there is a discal series of loops proximal to the white bar. H.-w.: Dusky at the base and along the inner fold; margin dusky with ochreous patches at the tips of the veins. An outer post-discal series of arrow-shaped marks is present followed by a submarginal series of stronger blackish dots connected up by black angles at the veins.

Underside: The median band of above is here represented by a stronger line especially on the h.-w. Distal to the line the wings are whitish to buff with a slight dusky shading in the incised area of the f.-w. and margin of h.-w. The submarginal and outer post-discal marks are faintly indicated, but the white areas internal to the median line are accentuated by black outlines and from the median line to the base of the wings the ground colour is either ochreous grey or ochreous with a strong pink tinge.

EARLY STAGES: The eggs are laid on the young shoots of *Rinorea* (VIOLACEAE), usually on the lower surface toward the edge. They are rounded cones with flat facets and short spines, and of a greenish colour. The larva is brownish olive at first, but turns a sap green at the second moult. The mature larva is bluish-green with short blackish spines greenish at the base and slightly branched at the tips. The spines on the segments after the first thoracic are longer and much more branched throughout their length. The dorsum of the segments is ornamented by a thin white line; on either side of this a broad dark green line with an interrupted yellow line running its entire length. Below the lateral line of spines is a narrow white line which shades off into the paler green of the underside. The head is yellowish with a few black spots, while the last segment is also yellowish. The pupa is a pale green with yellow spiracles, and with darker green areas on the thoracic case.

DISTRIBUTION: Most common in the Kakamega-Kabras forests the species ranges through most of the Uganda forests, sparingly in the central provinces but more abundant in south-western districts. The males are more in evidence than females, due no doubt to their conspicuous colouration. Males are often noted skimming just above the ground along pathways especially where wild fruits have fallen and lie about decaying. The similarity between the females and the *albimargo* form of *Euryphura plautilla* has already been noted.

[This species is seldom seen in the open, being confined to the dense forest where the males come down occasionally from the trees to rest a moment in a sunny patch on a low tree and then back again to the higher foliage. The colouring is magnificent as it suns itself with wings widely open, the brilliant

colour standing out from the intense green of the forest foliage. It is rarely seen feeding, but occasionally a male may be found amongst *Euphaedra* and *Euryphene* on the fallen fruits of some forest tree. The females strongly resemble those of *Cy. theobene* in flight.

The distribution of this species is interesting as it occurs from Kakamega, throughout Uganda, but not apparently into the Congo where its place seems to be taken by two other closely allied species.—T.H.E.J.]

CYMOTHOE CAENIS, Drury. Pl. 24, figs. 1-6. Pl. 26, figs. 1-6.
Pl. 25, figs. 1-6. Pl. 27, figs. 1-3.
Pl. 28, figs. 1-8.

Expanse: Male, 56 mm.; female, 60-65 mm. Sexes unlike.

MALE: General colour creamy white with green tinge, borders black. F.w.: Ground colour creamy-white with greenish tinge, costa narrowly black for basal two-thirds, the black then widening at the apex and outer margin of the wing, forming a black border, white spotted at the fringe in the interspaces. A post-discal series of angled black marks extends from 1a and 1b, where the marks are large, to the sub-apex; beyond this an admarginal series of larger and blacker arrow-head marks. Base of wing slightly dusted with blackish scaling.

H.-w.: Ground colour white with the fold and tuft greyish; vein 8 and the basal part of 7 black; an outer post-discal series of angled blackish marks largest toward the anal angle and gradually fading out extends up to 7. The border is black with white spots on the fringe and internal to this is an admarginal row of arrow marks, black in colour, largest in 4, 6, and 7.

Underside: Pale greenish-white shading to white distally, with a sharply defined median band beyond which the area is dusted and patterned with grey-brown. Distal to the median band is a series of post-discal arrow marks surrounded by whitish, and admarginally there is a further series of black dots joined up by angled lines; the border is shaded with grey-brown, while the fringe is darker brownish. The cells of both wings have fine black-lined marks and in the discal areas of both there are wavy broken lines of brownish.

FEMALE: The development of the female pattern and colouration appears to progress in two directions: one in which the pattern remains more or less constant, but there is a deepening in the ground colour from the male-like colour (*conformis*) to the deep sienna in the *adelina* forms; the other in which the pale whitish or creamy colour is retained as a discal bar in greater or lesser degree, vars. of *rubrida* to *dumensis*.

The different forms are described as follows:

- A. A form which superficially resembles the male, the ground colour being similar, but the cell is crossed by wavy black lines; the apex is more suffused with blackish grey as also are the borders of fore and hind-wings with the post-discal row of arrow marks larger and the admarginal series larger and showing up prominently in the greyish ground. = f.f. *conformis*, Auriv. Pl. 24, figs. 2-3.
- A1. A modification of the above in which the cell marks of both fore and hind-wings are more marked and with blackish scaling in 4-6 beyond the cell; a greater amount of black marginal border with the admarginal and post-discal outer row of spots more clearly defined and darker. In this form there is a very slight yellowish suffusion over the base of the cell in the fore-wing and the post-discal arrow marks in the hind-wing in 3-5 are yellowish. Pl. 24, figs. 4 and 5.
- A2. A further modification in which the bases of both fore and hind-wings are suffused with orange to just before the end of the cell, and the arrow marks in 3-5 in both fore and hind wings are orange. The admarginal hastate black marks are larger. This transitional form is an approach to B. = f.f. *rubida*, Holl. Pl. 24, fig. 6.
- B. Into this category come certain transitional forms which combine the characters of *rubida* and *dumensis*, Strand. They may be described as having the basal areas of fore and hind-wings strongly orange to beyond the end of the cell with this colour more or less defined distally, so that there is a wide bar of the whitish ground crossing both wings, between this orange base and the wide dark marginal border; the marginal border again suffused with yellowish to orange between the post-discal row and admarginal spots particularly in areas 4-5 of the hind-wing. Pl. 25, figs. 1 and 2.
- B1. A modification in which the orange basal areas particularly in the fore-wing in the region of the cell strongly dusted over with greyish scaling and the distal border of the orange outlined with a dark zigzag line. This is an approach to C. Pl. 25, fig. 4.
- B2 represents transitional forms toward *obscura*, Schultz, in that the basal orange areas are more suffused both in the fore and hind-wings with greyish scaling and the discal band is obscured. There is a tendency to a more reddish-tawny basally. Pl. 25, figs. 5 and 6.
- C. A form in which the basal areas are strongly sienna or red-brown sharply defined distally where there is a defined whitish to yellowish discal band which on its distal border is defined by the blackish arrow marks of the post-discal row of

spots. The marginal border is blackish but the surround of the admarginal large black hastate spots is orange. = *dumensis*, Strand. Pl. 25, fig. 3.

- C1. Somewhat like the above but the discal band more light orange and less defined, especially proximally. Pl. 26, fig. 1.
- D. Forms in which the general pattern is similar to A and A1, but the ground colour is orange. = *lutea*, Schultz. Pl. 26, figs. 2-3.
- D1. Can be described as a pale *lutea* in which the ground colour is yellow. In some, there is a suffusion of greyish scaling over the bases of the wings especially over the base of the fore-wing cell. Pl. 27, figs. 1-3.
- E. Similar in pattern to D, but the ground colour a richer darker orange tawny to orange, to sienna, with hardly any paling off in the region of the discal band. = *adelina*, Hew. Pl. 26, figs. 4-6.
- E1. Very like above, but basal areas suffused with greyish, and the marginal dark border not invaded in 4-5 of h.-w. or 1b and 2 of f.-w. with sienna.

EARLY STAGES: Unknown to me.

DISTRIBUTION: Forests of Uganda, particularly central and western. They appear to be particularly numerous in the forests to the east of Lake Albert, Bugoma, and Budongo, and again in the Mawakota forest. The species is one of those which, on occasion, will migrate in vast numbers.

[This is a forest species, but occasionally migrates and is then found in the open. The males of this and all other species of the genus like to sun themselves on a particular branch from which they drive off all intruders. They may be taken occasionally on rotting fruit or rarely on the droppings of leopard, hyaena, etc., but this is less common than in the other genera of the group.

The females similarly may sometimes be seen on fallen fruit, but they are more wary than the males and are usually seen for a second as they dodge across an open space in the forest in search of the food plant.

There appears to be a distinct lag in the emergence of the female sex, the males always appearing first.—T.H.E.J.]

CYMOTHOE HERMINIA JOHNSTONI, Butler.

Pl. 29, figs. 3 & 6. Pl. 30, figs. 1-6.

Pl. 31, figs. 2-8. Pl. 34, fig. 1.

Expanse: Male, 55-60 mm.; female, 60-75 mm. Sexes unlike.

MALE: General colour cream with a broad black border carrying light spots. There is some variation in the degree of

black and the colour of the ground surrounding the admarginal black marks.

F.-w.: Ground colour cream with a greyish shading at base; costa increasingly black from mid-point to apex; marginal border broadly brown-black, the proximal edge being deeper black and strongly dentate; the admarginal row of arrow-shaped black marks are broadly surrounded by cream and joined together by fine black lines, the two largest spots are in 3 and 4.

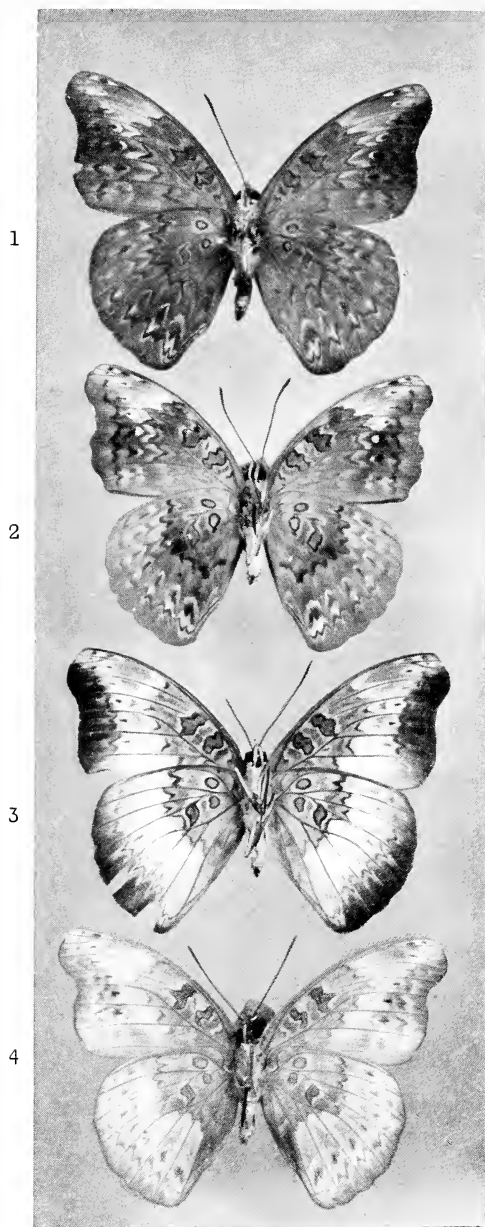
H.-w.: Ground colour as fore; the base shaded with grey, and passing to brown-black through the base of the cell and down the inner fold. The black bar present on the fore-wing is carried down through the hind-wing to just above the anal angle, whilst the admarginal arrow-marks are again repeated, the two largest being in 3 and 4. The border is black-brown, narrowest at 5 and 6, whilst the fringe has white spots mid-way between the veins.

(The above description applies to an average male, but two extreme varieties are to be found: (a) a very much darker form which occurs in the western distribution of this race, and (b) a very light form in the south-eastern portion of its range. Both of these will be referred to later.)

Underside: Creamy-ochreous, with a narrow median line crossing both wings, the proximal area with a zig-zag pattern of brown lines enclosing areas with brownish scaling; on the distal portion of the wings, the black dentate bar of above shows through, as also does the series of admarginal marks, though on this surface they are represented as small black dots. The wing fringe is brownish with white dots. The incised portion of the fore-wing is rusty-tinged.

MALE VARIATIONS:

A. A form in which the dark border is very much wider in both fore and hind-wing, more intense in colour and strongly defined proximally. The admarginal arrow-marks are surrounded with less ground colour, which is strongly bright orange-yellow instead of cream. The underside is heavily marked both within and outside the narrow median line; whilst the admarginal arrow marks, accentuated by a light ground, are well defined in all areas except 3 and 4 of the fore-wing, and 4 of the hind-wing. Such a male shows a strong approach to the nominotypical *herminia*, but as it flies with the typical *johnstoni* in the Kalinzu forest of West Ankole, Uganda, it must be considered only a form of the race *johnstoni*. Furthermore it differs from the race *herminia* in that the black border is not so narrow and restricted to the margin, thus the yellowish surround to the arrow marks is more restricted. Pl. 29, fig. 1. Pl. 31, fig. 1.



Euryphura plautilla albimargo, Talbot.

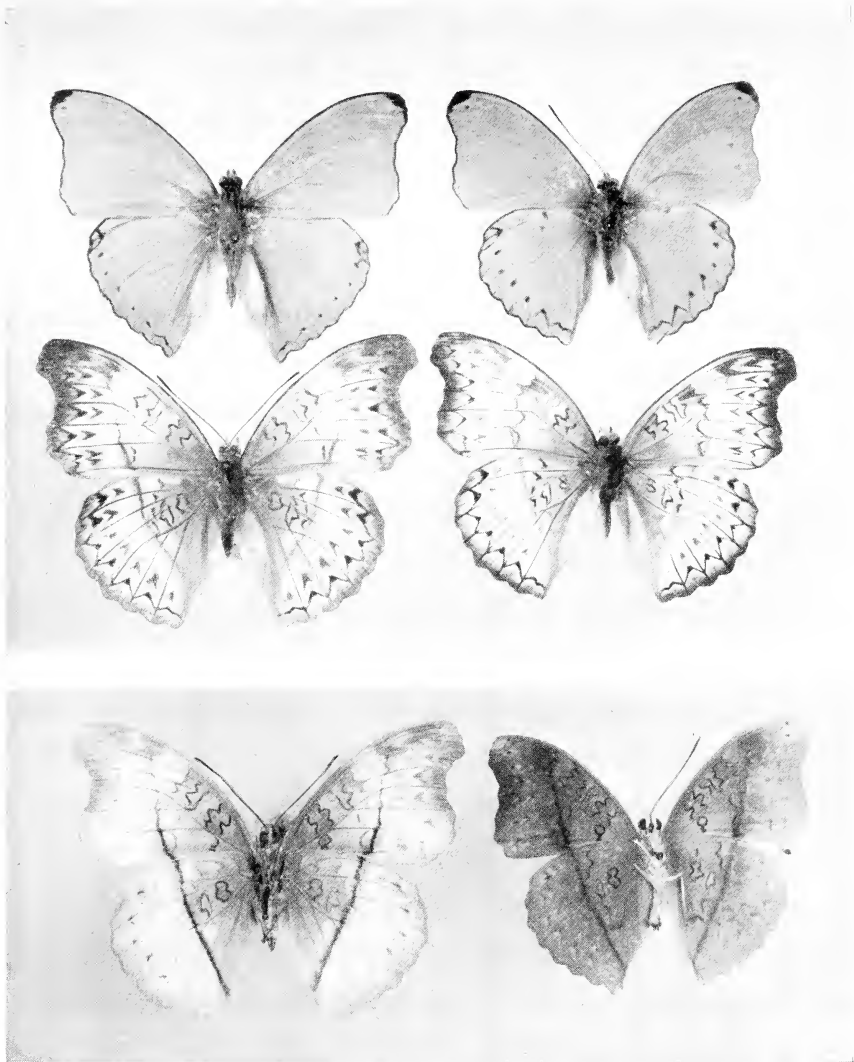
Under surfaces.

Fig. 1, f.f. *neo-oliva*, van S.

Fig. 2, f.f. *neo-albofasciata*, van. S.

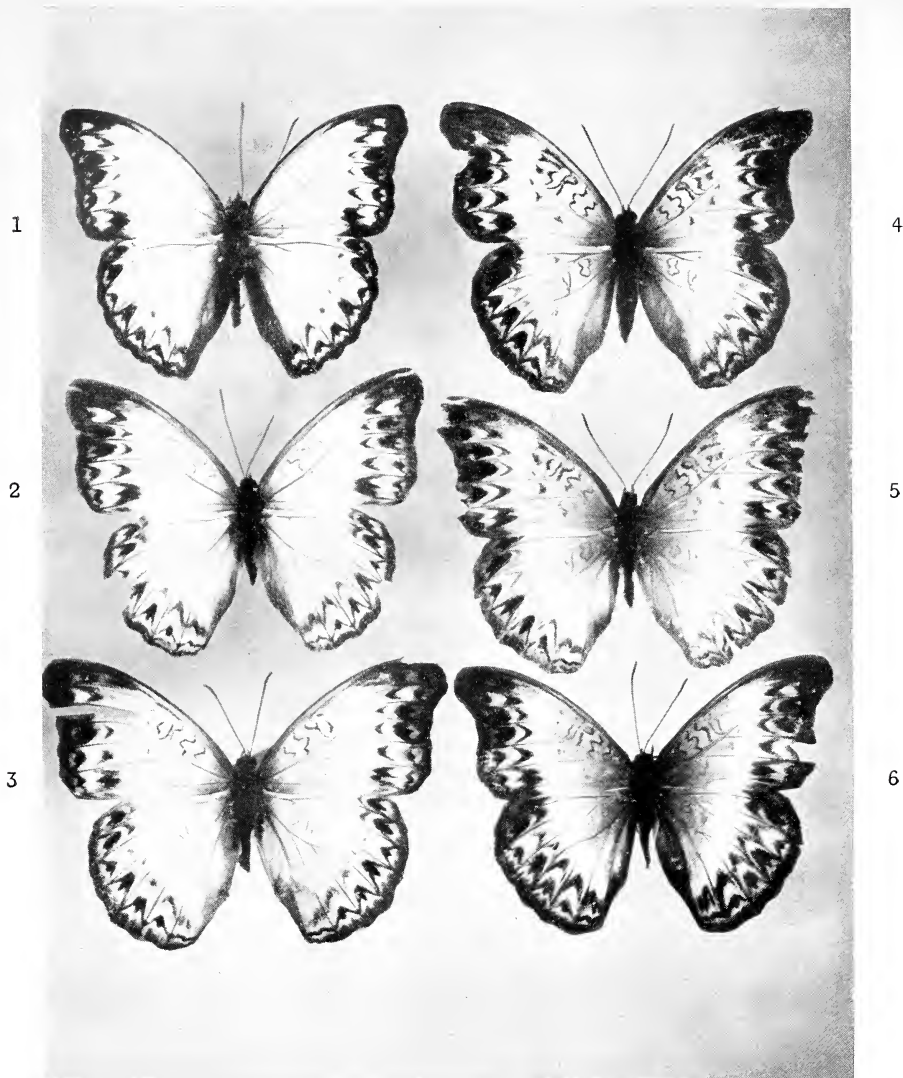
Fig. 3, f.f. *bicolor*, van S.

Fig. 4, f.f. *albimargo*, Talbot.



Cymothoe sangaris hobarti, Btlr.

Figs. 1 & 2, males, upper surface. Fig. 6, male, under surface.
Figs. 3 & 4, females, upper surface. Fig. 5, females, under surface.



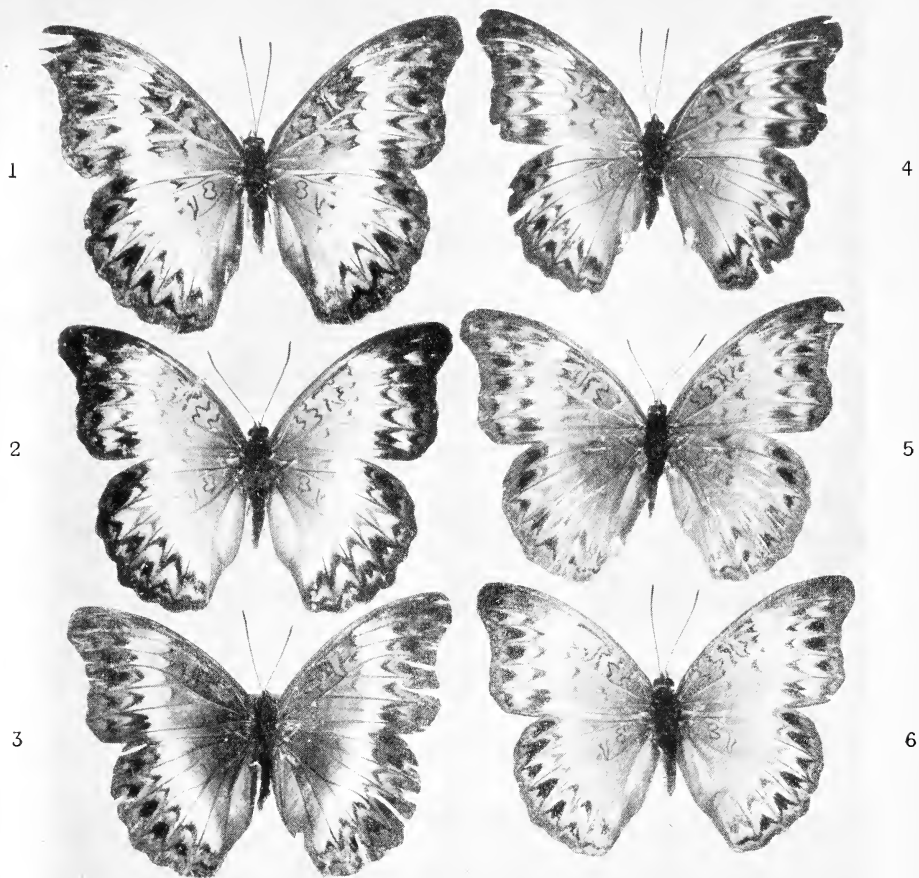
Cymothoe caenis, Drury.

Fig. 1, male, upper surface.

Figs. 2 & 3, male-like females, f. *conformis*.

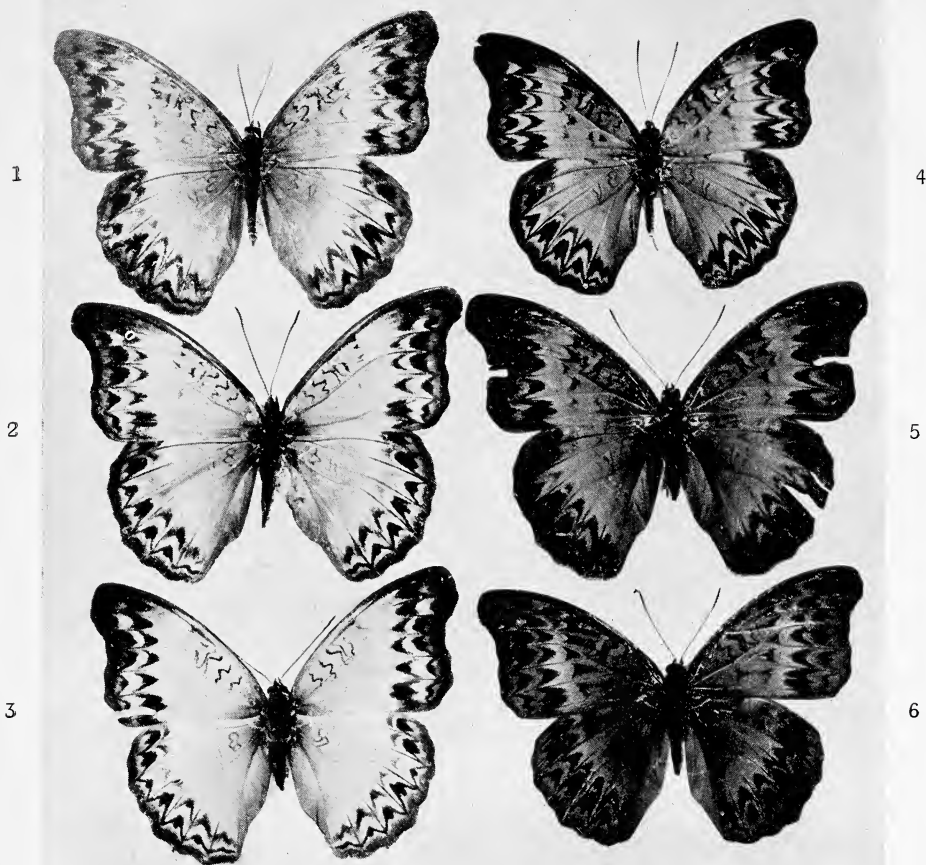
Figs. 4 & 5, transitional to *rubrida*.

Fig. 6, female, f. *rubrida*, Holland.



Cymothoe caenis, Drury.

- Figs. 1 & 2, transitional to *rubrida*.
 Fig. 3, female form *dumensis*, Strand.
 Figs. 4 & 5, transitional to *lutea-adelina*.
 Fig. 6, transitional to *lutea*.



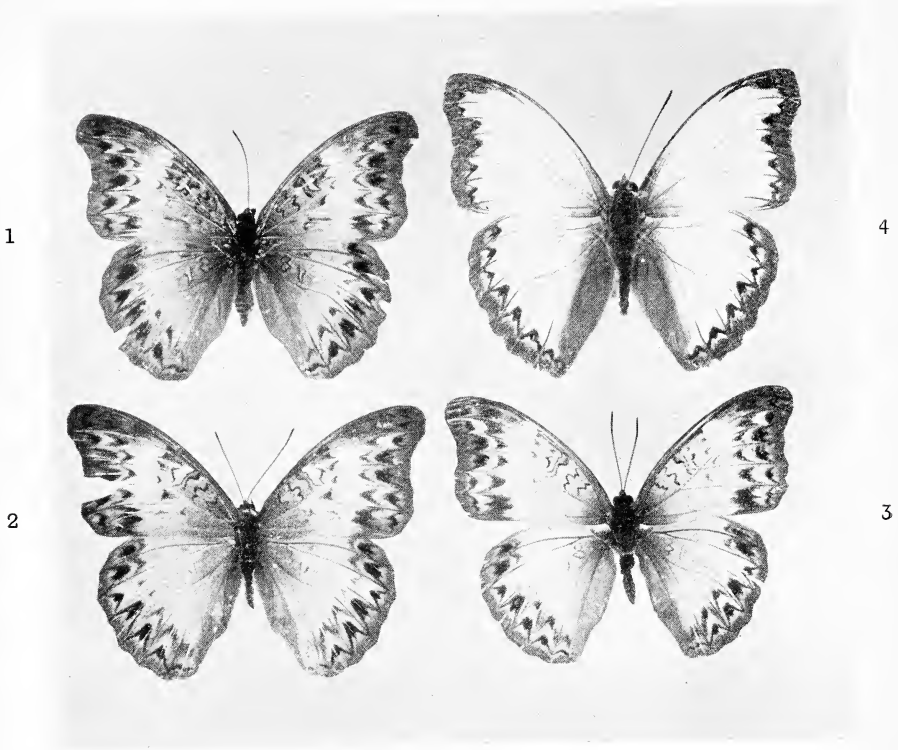
Cymothoe caenis, Drury. Female forms.

Fig. 1, transitional to *lutea*.

Figs. 2 & 3, f. *lutea*, Schultz.

Figs. 4-6, f. *adelina*, Hew.

PLATE 27



Cymothoe caenis, Drury.

Figs. 1 & 2, pale yellow, transitional to *lutea* X *conformis*.

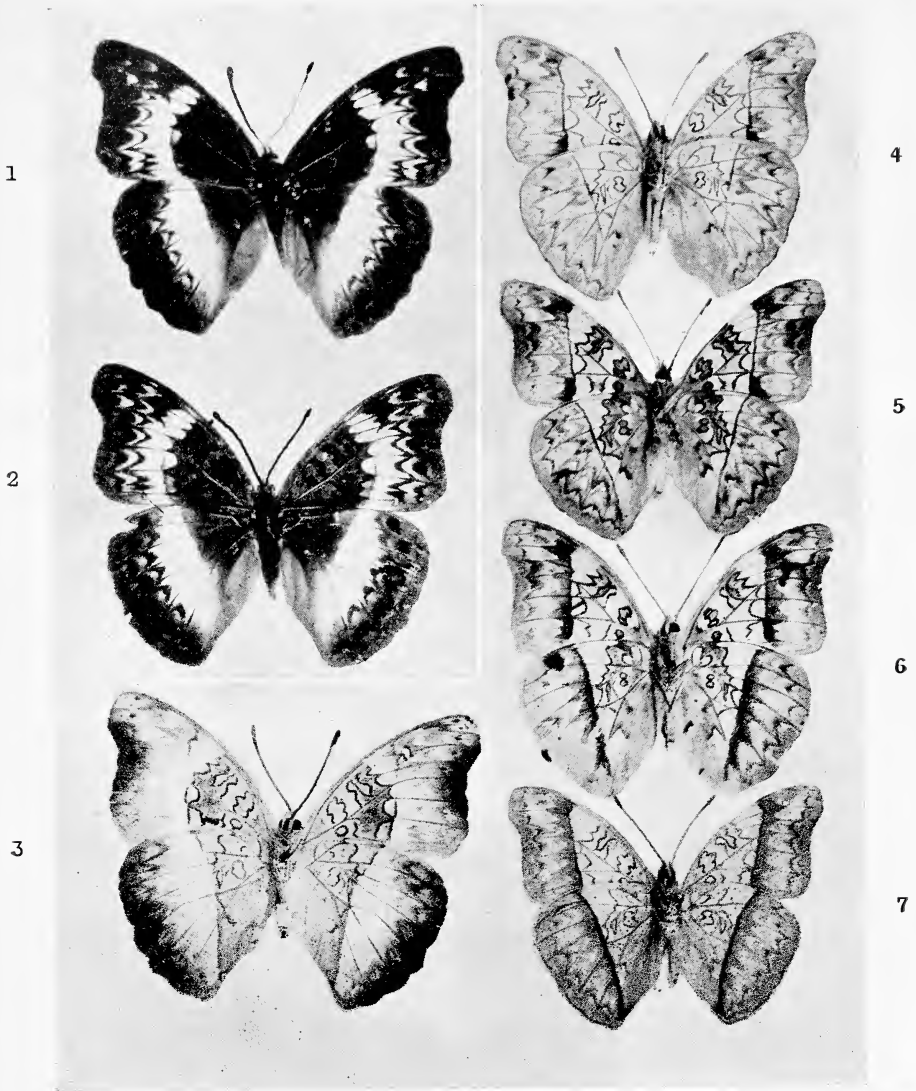
Fig. 3, transitional, *conformis-lutea*.

Cymothoe coranus, Smith.

Fig. 4, male upperside.

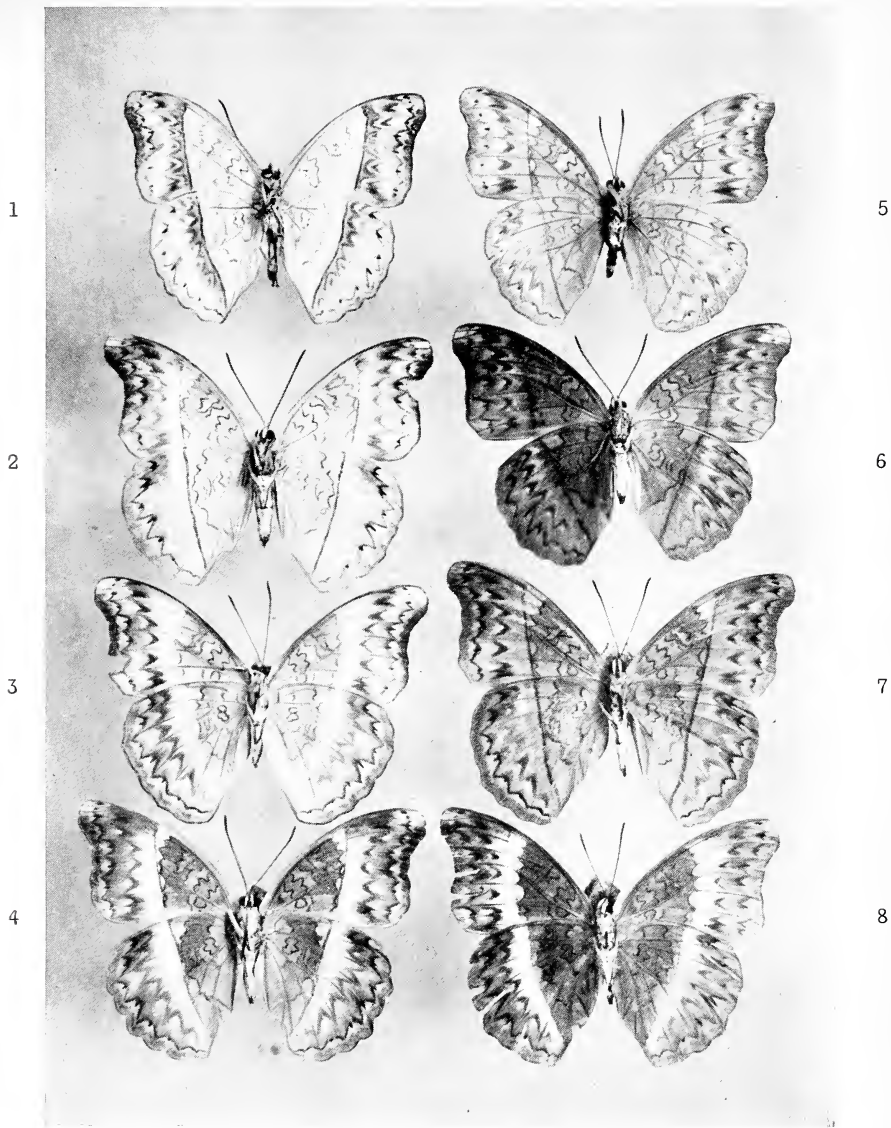
(For other figures of this species vide Pl. 27a and Pl. 34, fig. 6.)



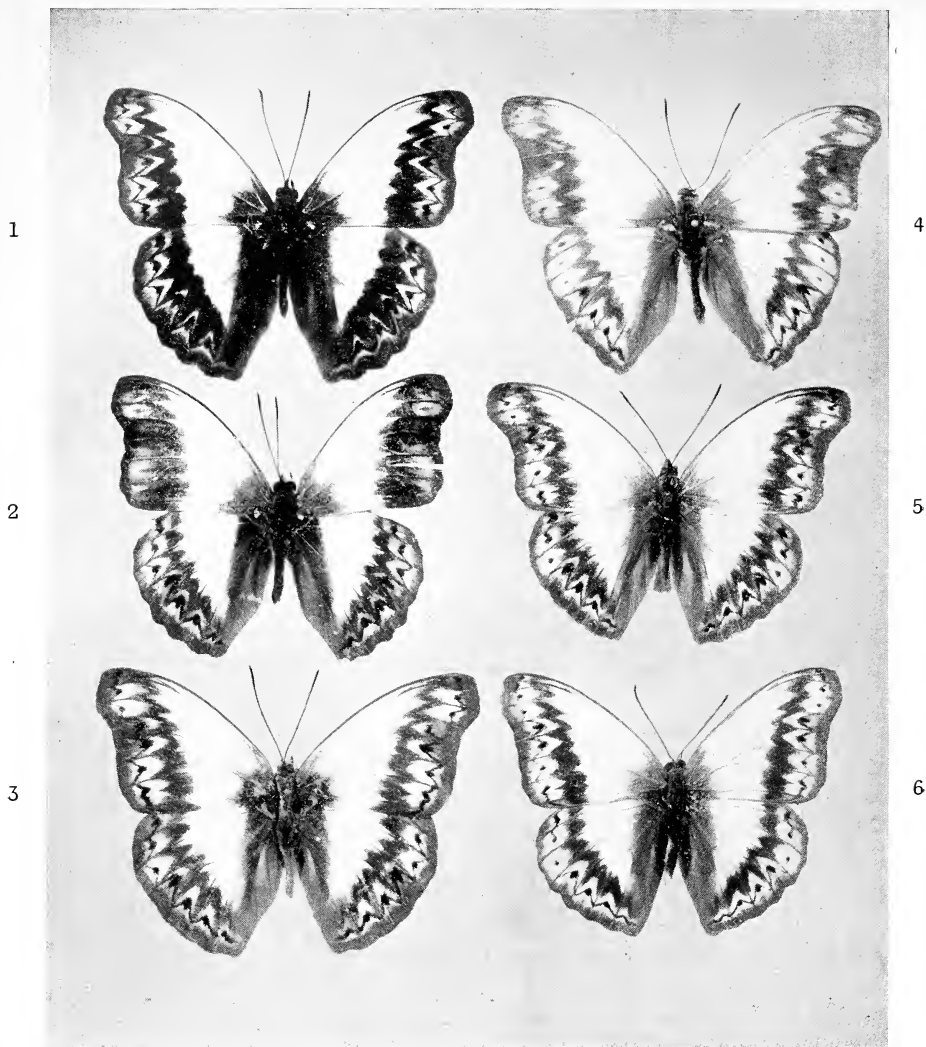


Figs. 1-3 females *Cymothoe coranus*, Smith.

Figs. 4-7 males, underside.



Cymothoe caenis, Drury (undersurfaces.)
 Fig. 1, male. Fig. 2, f.f. *conformis*.
 Fig. 3, f.f. *rubrida*. Fig. 4, f.f. *dumensis*.
 Fig. 5, f.f. nr. *lutea*. Fig. 6, f.f. *adelina*.
 Fig. 7, f.f. *lutea*. Fig. 8, f.f. *dumensis*.



Cymothoe herminia johnstoni, Butlr.

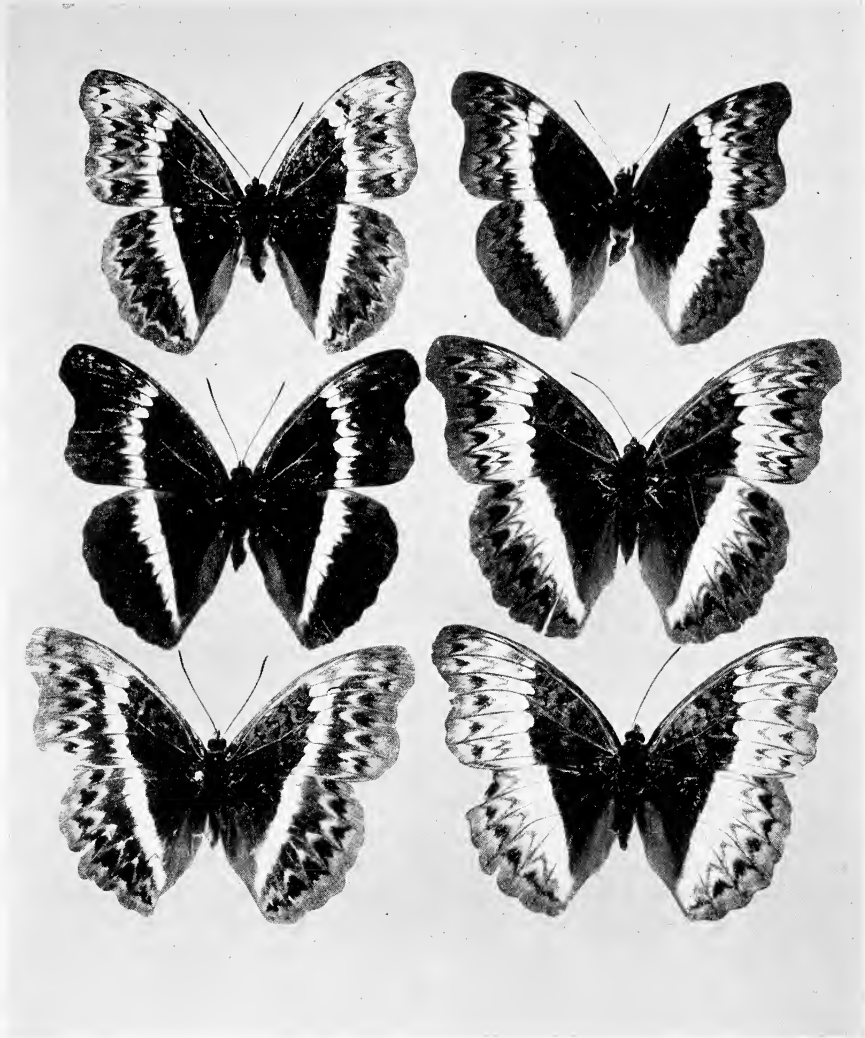
Fig. 1, transitional to *herminia herminia*. (See text.)

Fig. 2, transitional between *herminia* and *johnstoni*.

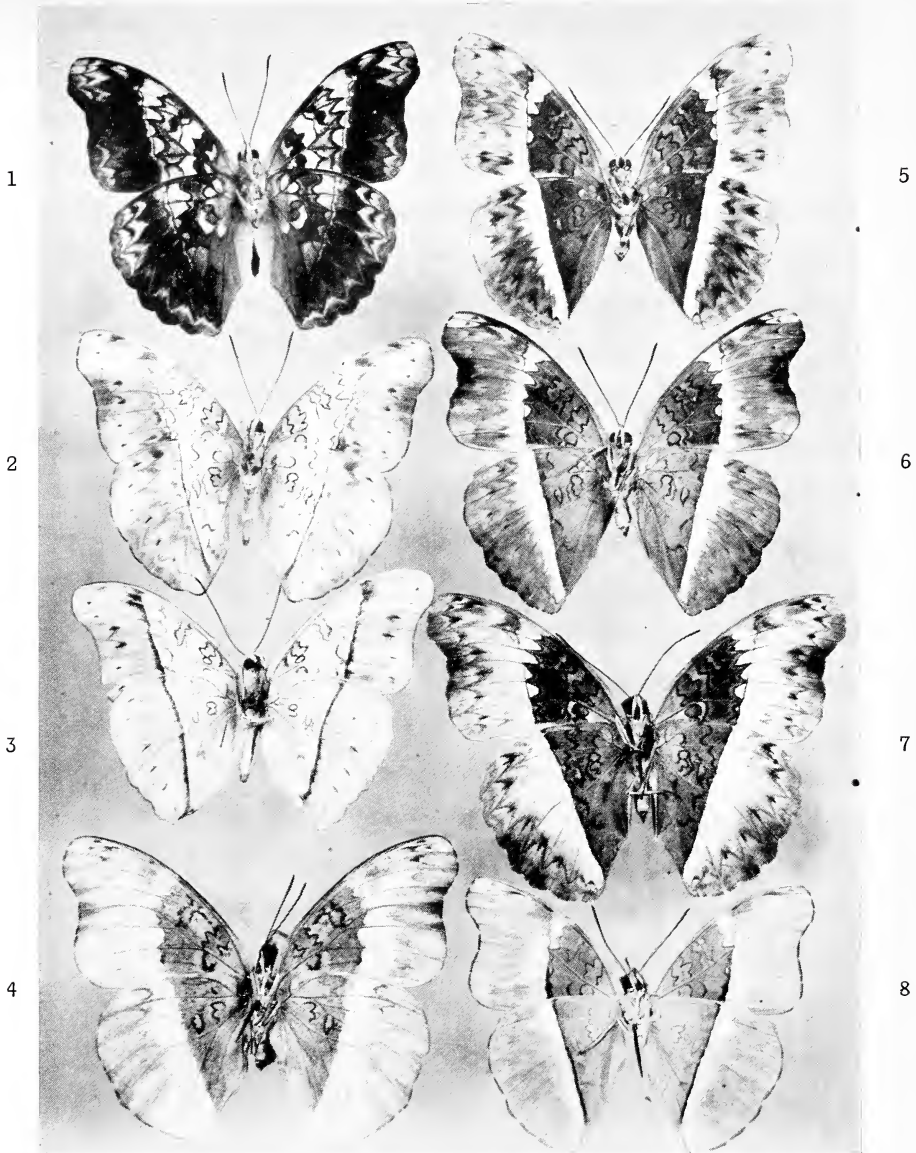
Fig. 3, almost typical *johnstoni*.

Figs. 5 & 6, typical male *johnstoni*, Btlr.

Fig. 4, an extreme pale form of *johnstoni* (South Kavirondo). (See text.)

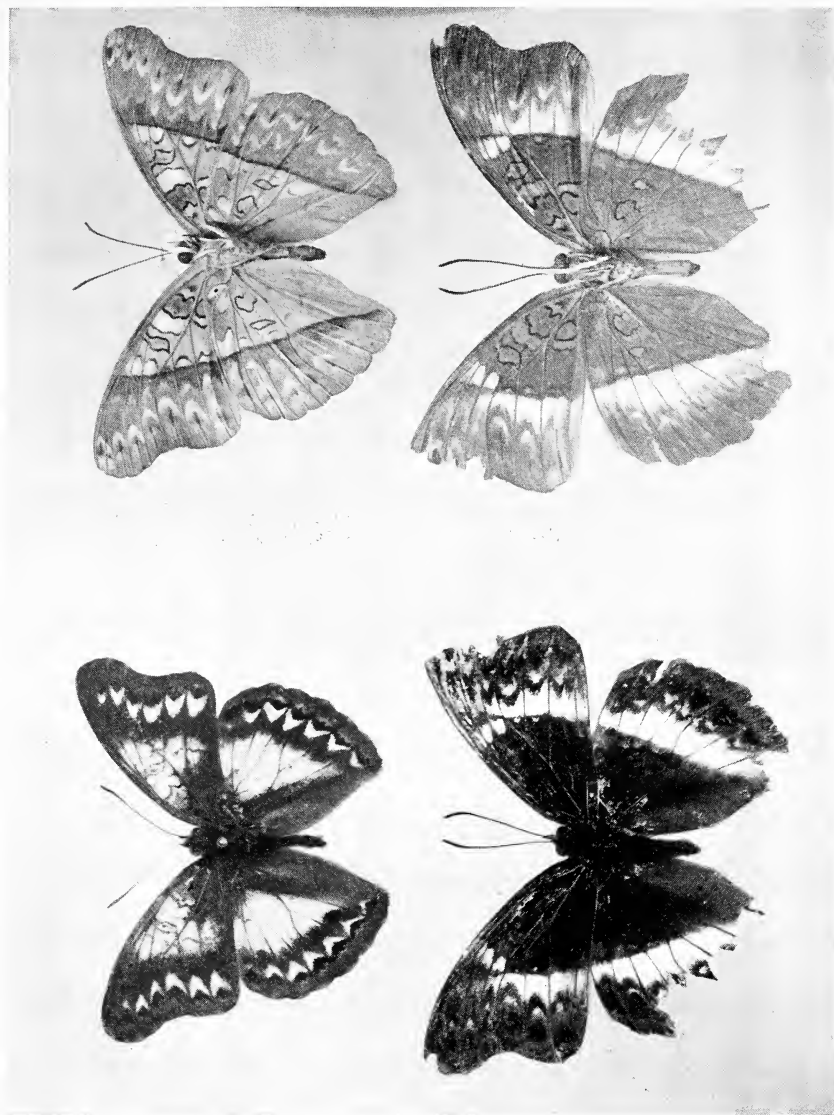


Cymothoe herminia johnstoni, Btlr. Female forms.
 Fig. 1, f. *sultani*, Bryk. Fig. 4, f. *kakamega*, van. S.
 Fig. 2, f. *bipartita*, van S. Fig. 5, transitional between 3 and 6.
 Fig. 3, f. *johnstoni*, J. & T. Fig. 6, *confluens*, van. S.



Cymothoe herminia johnstoni, Btlr. Under surfaces.

Fig. 1, male *herminia*. Fig. 5, f.f. *sultani*, Bryk.
 Figs. 2 & 3, *johnstoni* (males). Fig. 6, *bipartita*, van. S.
 Fig. 4, f.f. *budongo*, van. S. Fig. 7, f.f. nr. *confluens*, van. S.
 (vide P. 34, fig. 1). Fig. 8, f.f. *kakamega*, van S.



Cymothoe teita, van. S.
Figs. 1 & 2, males, upper and under surfaces.
Figs. 3 & 4, females, upper and under surfaces.

A variation of the above occurs in which, although the wide border is present, the fore-wing arrow marks and light surround are not clearly defined, but diffuse. Pl. 29, fig. 2.

- B. In contrast to the *herminia*-like variation of the western Ankole district, there occurs in South Kavirondo an extreme pale form which has the appearance of an extension of the cream ground outward toward the apex of the fore-wing and only separated from the cream spots of the apex by narrow dark angled lines. The dark marginal border is not strongly defined, and the admarginal black marks, arrow-shaped in the other forms, are here small dots except toward the hind angle of the hind-wing. In addition, the cream spots are almost obliterated in areas 3 and 4 in the fore-wing.

Pl. 29, fig. 4. On the underside, a marked feature is the width of the dark median band, wider than in typical *johnstoni*, almost straight in the fore-wing but curved inward toward the cell in the hind-wing. Six males from S. Kavirondo are similar in all these respects. (For underside, see Pl. 31, fig. 3.)

FEMALES: In this species we find that the female sex exhibits distinct though not very striking colour differences, for all are of a black and white combination.

I have figured the more distinctive variations on Plates 30 and 31. In consultation with Mr. Talbot, and as the result of his kind assistance, I am able to cite what should be accepted as the nominotypical female, f. *johnstoni* (*Bull. Hill. Mus.*, 1, p. 59, Pl. X, fig. 17) and described as such by Joicey and Talbot.

Broadly speaking, the female forms can be divided into two groups, (a) in which the dark ground is traversed by a discal white bar on both wings distal to which the dark arrow marks are *not* accentuated by white; (b) in which, in addition to the discal white bar, the arrow marks are proximally, and to an extent distally, accentuated with white.

GROUP B.

- (1) Female f. *JOHNSTONI*, J. & T. (Pl. 30, fig. 3.)

Ground colour, brown-black, with a *narrow* discal or median band of white in almost a straight line from just above the anal angle of the hind-wing, to 3 in the fore-wing, then set slightly in and extending to the sub-costa, through 4-6. The proximal edge of the white bar is almost straight in the hind-wing, and indented along the veins in the fore-wing. On the distal side the band is dentate to a greater or less degree. In the type, it is strongly dentate, but in the specimen I figure it is less so. Beyond the band is a series of black arrow-head marks, apices inward, accentuated proximally by white, following the general contour of the wings.

The fore-wing cell is crossed by wavy black lines; the hind cell has an ovoid black mark toward the apex, and an 8-shaped mark at its centre.

The specimen figured differs from the neallotype *johnstoni* only in that the post-discal white marks are set further out from the white band; otherwise it agrees very well.

Underside: Ground colour ashy-grey-brown; discal bar as above but not so distinct; dark arrow marks present proximally edged with white as above, and distally bordered with the same colour but to a greater degree than above. Hind cell with dark marks as above; base of 8 with a whitish mark. Fore-wing cell with narrow wavy lines as above, and with white bars proximally and distally; 1b with a dark circular mark with white areas on either side.

(2) Female f. *CONFLUENS*, f. nov. Pl. 30, fig. 6.

This form can be taken as the extreme in this group. It is characterised by the great width of the discal white bar which is separated from the white marks in the post-discal area by indistinct angle dark marks, almost obscured in 3 in the fore-wing. The marginal border is not strongly dark, and the arrow black marks are not so acute, thus not so long. The underside shows a correspondingly greater amount of white with only faint dark angled lines and small black dots corresponding to the arrow marks of above.

Type, female, Budongo forest, May, 1936, T. H. E. Jackson.

Mr. Talbot informs me that there is a similar specimen in the B.M. from Kalinzu Forest.

(3) Female f. Pl. 30, fig. 5. Pl. 31, fig. 7.

This is an intermediate form between *johnstoni* and *confluens* and need not be distinguished by a separate name.

GROUP A.

(1) Female f. *BIPARTITA*, f. nov. Pl. 30, fig. 2. Pl. 31, fig. 6.

Differs from f.f. *johnstoni* by the more intense blackish ground colour both proximally and distally to the discal white band which is narrow, and tapering toward the hind-angle, more curved in the fore-wing, and generally narrower in areas 3-6. The dark ground distal to the median band has no white in the post-discal zone, and the black arrow-head marks show up indistinctly in the blackish ground. The underside is considerably darker than in *johnstoni* and has a distinct purple tone particularly in the fore-wing proximal to the discal white band which is more sharply defined throughout its length. This is the darkest form of female. The post-discal and submarginal dark marks are obscured in the ground colour.

Type, female, Kalinzu Forest, W. Ankole. T. H. E. Jackson, October, 1937.

(2) Female f. KAKAMEGA f. nov. Pl. 30, fig. 4. Pl. 31, fig. 8.

Resembles somewhat the form *bipartita*, in the intensity of the dark ground proximal to the white discal band which is wider in both fore and hind-wing, but the distal dark border is more brownish and thus the post-discal angled dark marks and the submarginal arrow-head black marks show up very distinctly; furthermore, there is a series of white angled marks distal to the post-discal angled marks. The bases of areas 3-6 beyond the cell are very blackish, whilst the dark cell marks stand out conspicuously.

The underside is distinctive, having the greyish-ochreous ground colour suffused with olive proximal to the discal band which is strongly defined proximally by a brown median line throughout the hind-wing and on the fore-wing to as far as 3. The distal portion of both wings is strongly ochreous-grey and the dark marks of above do not show through nor are indicated by dots.

Type, female, Kakamega, July, 1935, T. H. E. Jackson.

(3) Female f. BUDONGO f. nov. Pl. 31, fig. 4. Pl. 34, fig. 1.

A curious form in which the basal areas of both wings internal to the discal white bar is brownish-black with the usual dark marks of the cells of both wings obscured. The white band is broad throughout, but fades out toward the costa of the fore-wing (as here it is dusted over with dark scales) at the bases of 4-6, but white scaling is present as a continuation of the discal bar toward the sub-apex at about the mid-points of these areas. The usual angular extension of white from the bar into 2 and 3 across the median line is scaled in greyish so that the band has a straighter proximal edge up to 4. On the distal edge of the band are angular dark lines in the hind-wing, and arrow-head marks in the fore-wing, both blacker than is usually the case, with only a slight whitish scaling in the angles, but the dark arrow-head marks so conspicuous in the hind-wing of the other forms are entirely absent here.

On the underside, the basal areas of both wings are ashy-grey with the dark cell lines and marks unusually prominent especially that in 1b of the fore-wing and the apical cell spot in the hind-wing. The discal band is not well defined and shades into the border which is only slightly dusted with greyish scales, and brownish along the edges. The angular marks of above are here grey.

Type, female, Budongo, May, 1936, T. H. E. Jackson.

GROUP C.

Female f. *SULTANI*, Bryk. Pl. 30, fig. 1. Pl. 31, fig. 5.

This conspicuous form is somewhat like *bipartita* in the form of the discal white bar and the dark basal half of the wings, but differs in the distal portions, being lighter, more brownish, and in having the distal edges of the dark arrow marks and to a certain degree the proximal edges in the fore-wing, bordered with ochreous-yellow much as in the herminia-like male already described. The underside is very strongly marked both as regards to ground colour which is ochreous-grey with a purply bloom, and the dark post-discal and sub-marginal marks. There is a suffusion of ochreous scaling toward the sub-apex of the fore-wing.

This type of female has been taken in the Kalinzu area and not eastward.

EARLY STAGES: The eggs are laid on the young leaves and shoots of two species of plants, *Rawsonia* and *Dorvyalis* (FLACOURTACEAE). The are at first greenish white in colour. In shape they are elongate domes with faceted surfaces and with fine spines usually at the angles of the facets. The eggs are usually laid on the underside of the leaves. The larva is green with a median yellowish line and along the dorso-lateral aspect of each segment are short feathery spines. The bases of the spines are bluish. The pupa is green, darker on the thorax and paling off on the wing scutes. The head is bluntly bifid; the two projections are yellow and from these a yellow line runs along the angle of the wing cases, along the dorsal line as far as the spiracles. These spiracles are black dots on a yellow base. The thorax is strongly keeled, but not so much as the abdominal segments which are acutely ridged. The cremaster and stalk are orange with one large central black mark and one small black dot on either side. The last abdominal segment also has two black dots on the ventral surface. The duration of the pupal stage is approximately three weeks, though in a few cases the insect emerges after a month or more.

DISTRIBUTION: Within Kenya, the localities from which we have taken the species are Kisii and South Kavirondo in wooded areas; it also occurs in Kakamega, Kabras, and Elgon, whilst in Uganda it is common in most of the forests, particularly those of central and western Uganda.

[Very similar to *Cy. caenis* in general habits. The males choose a sapling or branch of a tree and will stay in the vicinity for hours at a time, chasing away any other insect that may encroach on their preserves. The females stay largely in the thicker undergrowth, but may be found on the edges of clearings or roads where they sun themselves for a moment, then fly

swiftly across to disappear on the other side. The species may be found rarely on rotting fruits or on droppings of carnivora.

Cy. herminia johnstoni extends much further eastward than does *caenis*, being common in the Kakamega-Nandi area. As one travels westward it tends to merge into the typical or nominate race *herminia herminia* and in the Kalinzu forest in western Ankole, occur forms which are practically identical with forms from the type locality. The type of *johnstoni* came from Toro, thus within the west of the distribution of the race and not very far in reality from the areas where overlapping with *herminia* takes place.

The females appears to be less variable than those of *Cy. caenis*; in its western distribution there is a tendency to yellowing instead of white on the margins of the wings. Vide f.f. *sultani*, Bryk.—T.H.E.J.]

CYMOTHOE CORANUS, Smith. Pl. 27, fig. 4. Pl. 27a, figs. 1-7.

Expanse: Male, 55-60 mm.; female, 60-65 mm. Sexes unlike.

MALE: Ground colour creamy white with a blackish border.

F.-w.: Ground colour cream, with dusky scaling at the bases of 1a and 1b and slightly in base of cell; costa black edged, the black widening out toward the apex where it becomes continuous with the blackish-brown border of the outer edge of the wing. This border is narrowest in 5, widest in 4 and 3, and at the line of contact with the cream ground is accentuated by a series of black arrow marks. In some specimens there is a slight amount of cream just distad to the arrow marks in 1b and 2.

H.-w. creamy white, with greyish scaling at the base of the cell, and along the inner fold where it is slightly brownish. The dark border is fairly uniform in width, averaging 3 mm. and gradually shading off at the upper angle. Just internal to the border is a series of black contiguous arrow marks, the bases of the marks touching the dark border, but enclosing a slight amount of cream scaling.

There is little variation in the males on the upper surface; it usually takes the form of an increase or reduction in the amount of cream colour distal to the submarginal row of black marks in the hind-wing and in areas 1b and 2 of the fore-wing.

Undersurface: There is considerable variation here, which, broadly speaking, is due to the presence or absence of dusky scaling within the general pattern of outline dark marks. The ground colour varies from a cream to creamy-ochreous. Both wings are crossed by a dark median line, that of the fore-wing being almost straight, bent only toward the costa in 6; the hind-wing line, commencing at about mid-point in the costa, is slightly curved inward and extends to the anal angle. Internal to the

median line of the fore-wing is a series of dark-lined loops, from 1b-6, those in 4-6 being elongate; these are characteristic, and persist in both sexes. On the proximal side of the median line of the hind-wing is a similar series of irregular-shaped dark lined marks. In the fore-wing cell is a trilobed dark lined mark, followed by a mark in 1b; in the hind-wing the cell contains an 8-shaped mark. Distal to the median line of both wings is a double row of wavy shadow lines, which in some specimens coalesce, thus forming a dark zone of brownish-grey. Beyond this is a wavy angled submarginal line, with a uniform border beyond, or in some specimens strongly shaded with rusty to brownish in 3-5. The general pattern of dark lines is the same in all variations, the difference in appearance being the dusting over of the intervening spaces with grey-brown scaling.

FEMALE: General colour black with a white bar.

F.-w. black-brown with a white discal band commencing at about mid-point in 1a, thence curving up toward the costa just beyond the cell. In some cases there is a slight extension of the white, into areas 1b-3, on the inner side of the position of the dark median line already referred to in description of the male. The proximal edge of the band is sharply cut, whilst the outer edge is irregular and dentate. Adjacent to the band is a series of post-discal white angular marks extending through the sub-apex; and beyond, in areas 5 and 6, are two white sub-apical spots. Beyond and contiguous to the post-discal angle marks are black arrow-marks arranged to follow the contour of the wing.

H.-w.: Basal triangle black-brown with an extension along the inner fold. Beyond is a wide discal white band, slightly convex on its inner edge, more convex on its outer edge which is irregular, due to an angular extension of the dark ground in each area. The band gradually decreases in width toward the costa. Beyond the band is a series of white, somewhat angular, post-discal spots, bordered distally by a series of black arrow marks arranged in a curve and following the contour of the wing.

Underside: Both wings crossed by a median dark line almost straight in the forewing and strongly curved (concave) in areas 3-5 of h.-w., then through the apex of the cell, thence in almost a straight line to just above the anal angle. Internal to this line the ground colour is whitish-grey, carrying within the cell and beyond, and in areas 1b of the fore-wing, black-lined marks. The distinctive marks on the proximal side of the median line, referred to under the description of the male, are here equally represented, and form part of the discal white band which crosses both wings as described above. Beyond the band, the outer

edge of which is not sharply defined, the ground colour is greyish-white, with a varying degree of purply-brown especially toward the extremities of areas 3-4 of the fore-wing and from 3-6 on the hind-wing. Within this border are three parallel series of darker, shadow, angled marks.

The variation on the underside of the females is in respect of the degree of dark scaling proximal to the inner edge of the discal band of the fore-wing.

EARLY STAGES: These are unknown to me.

DISTRIBUTION: Within Kenya, this species is confined to the coast forests from Ganda to the Shimba Hills. There is some seasonal variation, as evidenced by the intensification of the markings on the underside of both sexes. Specimens taken in March-April are lightly marked below, whilst those captured in July are heavily marked. The first few specimens secured were taken by Messrs. Millar and Jeffrey in a patch of forest near Kwale; later in the year a series of eight males and nine females were obtained in the Makadari forest on the top of the Shimba hills. Although the species must have been numerous, it was only secured in one spot where a certain amount of tree felling had taken place and an open glade had been formed in the dense forest growth. Here many examples were seen as they glided along the sunlit opening for a few moments to disappear in the adjoining thick growth.

It will be seen from the plates that the female of this species resembles certain forms of *Cy. herminia johnstoni*, and furthermore, there is a similarity between them and the female of *Euptera pluto kinugnana*.

CYMOTHOE TEITA, sp. nov. Pl. 32, figs. 1-4.

Expanse: Male, 48-50 mm.; female, 60 mm. Sexes unlike.

MALE: General colour cream with black border carrying cream arrow marks. F.-w. strongly suffused with black over the base of the cell and basally in areas 1a and 1b with an extension of the black along area 1a so that it joins the broad black border. Costa reddish at the base then black where it merges into the black of the apex. Central portion of the wing cream, with the veins black, the cream area including the mid-portion of 1b, the bases of 2, the extreme of 3, 4-6. Beyond this cream area the wing is dark grey-black carrying a series of very distinct arrow-shaped cream marks accentuated distally by jet black. The tips of the veins are orange especially 5-7. H.-w.: Extreme base, costa, inner fold and broad marginal border dark grey-black, central portion of wing cream; the marginal border ornamented with cream arrow marks as in the fore-wing. End of veins with triangular orange tip marks; in between them the

fringe has a white spot. The black arrow marks are accentuated distally with a black line then by a narrow cream line.

Underside: Wings crossed by a narrow dark median line; the inner portion of the wings creamy with a slight greyish dusting at the base and along the fold of the hind-wing; outer portion of wings with greyish shading over the portion corresponding to the dark border of above; the arrow marks not well defined but obscured, but each with a black dot at base; areas 1a, 1b, and 2 distal to the median line rusty brown, strongly toothed, the other areas also toothed up to the costa in blackish; the incised portion of fore-wing shaded with blackish especially toward the fringe. The cells of both wings with black-lined marks; area 1b with a black circle and beyond this a crescentic black mark. Fore-wing with a discal series of crescentic black lines.

FEMALE: General colour black with a wide median white bar. Both wings with the basal half black, with black lines in the cells, the distal margin of the black area sharply defined and just within its edge small white dots in 2 and 3, and large white marks in 4 and 5 of the fore-wing, and in the hind wing diffuse white spots in 4-6. The marginal border is broadly grey-black, on its proximal edge, strongly dentate with black arrow marks, with white spots at bases, then admarginally a further series of jet black sagittate marks. The veins with triangular orange spots at tips.

Underside: Basal portion brownish-grey bordered by a brown median line. The white bar of above as well as the other white spots are here represented, but the outer border is purply-grey with a faint indication of the black marks of above; marginal orange spots larger than above. The fore-wing cell and the base of 1b have ochreous patches outlined in black.

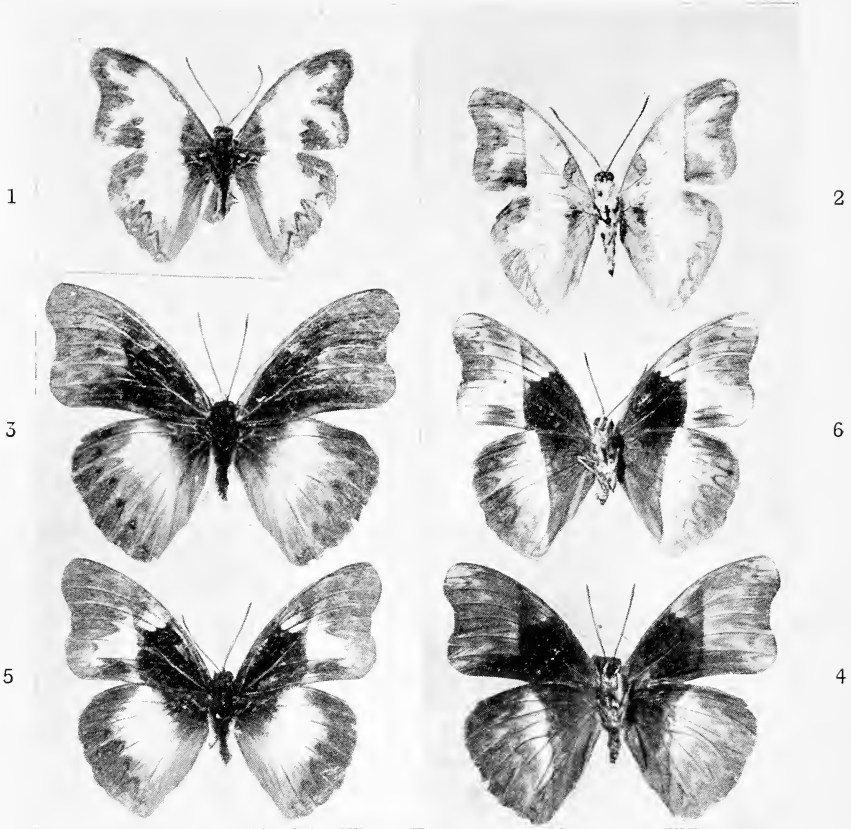
EARLY STAGES: Unknown.

Type: Male, Bura, 5,000 feet, October, 1938, in Coryndon Museum, Nairobi, Kenya. Paratypes four. Type of female with same data.

DISTRIBUTION: This species has so far only been taken on the Bura ridge and in patches of forest on the Teita Hills.

Remarks: This very distinctive insect was submitted to Prof. Carpenter of Oxford for his opinion. There is nothing like it in the Hope Dept., Oxford. Prof. Carpenter writes as follows: "It is not matched by anything in the British Museum. The red apical dots at edge of wing are quite peculiar; also the black lines traversing the f.-w.; also the sub-marginal white lunules are not 'staggered' as in *aurivillii*, Stgr. (= *zombana*) which seems to be nearest to it."

PLATE 33



Cymothoe indamora amorinda, van S.

Figs. 1 & 2, male, upper and under surfaces.

Figs. 3 & 4, f.f. *damora*, van. S., upper and under surfaces.

Figs. 5 & 6, f.f. *amorinda*, van. S., upper and under surfaces.

Of the female, he writes: "Very like a series of B.M. ascribed to *melanjae*, B.-B., but the male of *melanjae* differs considerably from yours except in respect of the lines crossing the white disc of the f.-w. Prof. Carpenter put forward the suggestion that *aurivillii*, *melanjae* and *teita* may be forms of a polymorphic species."

Owing to its distinctive feature I have described the Bura insect as a species. The five males taken are uniform in colour and pattern. There is a slight superficial resemblance between this species and *vumbui*, van Son., from the Vumba Mts., S. Rhodesia. It is possible that they are conspecific, and represent geographical races, but they are so distinctive that there is little chance of confusion of the two.

CYMOTHOE INDAMORA AMORINDA, subsp. nov.

Pl. 33, figs. 1-3. Pl. 34, figs. 1-3.

Expanse: Male, 55-57 mm.

MALE: General colour creamy white with black basal area and border. F.-w.: Basal area of fore-wing dark grey with a green bloom, with a darker spot in the cell and in 1b. Costa blackish with a slight expansion, sub-costa at apex of cell and then merging into the grey-black border. Blackish border with an irregular inner edge due to an extension of the cream-white toward the apex in 5, then obliquely down in 1b and 2; the dark areas in 1a, 1b, and 2 enclosed by this white projection and the white discal portion; the black in these areas darker than the border. There are also black lines at the apices of the marginal dark border. H.-w.: Basal area and an extension through 1b grey with greenish tinge; inner fold greyish; marginal border brown-grey with a dentate inner margin; disc of wing creamy with an extension of the cream ground into the border at 5. The border carries a series of black contiguous angles largest in areas 2-4 then smaller and less defined in 5-7. The black border is more dense at the upper angle.

Underside: Basal areas of both wings greyish, followed by a white zone sharply differentiated from the border and crossed by an almost straight median line. The cell has a few wavy lines at the base in black and in brown toward its apex; the indentation of the marginal border by the white ground colour as seen above is again reproduced below, but the dusky areas are here greyish with a slight brown tinge especially at the incision of the fore-wing.

Type, Kalinzu, W. Ankole, Oct., 1937 (T. H. E. Jackson). Paratypes, 8, Kalinzu, Oct., 1937, Jan.-April, 1938 (T. H. E. Jackson).

FEMALE: This sex occurs in two forms: (a) ground colour brownish-black, darker over the base of the hind-wing and fore-wing with the black area in this latter extending distally from a point at about mid 1a through to the costa to almost the origin of vein 7. There is often a contiguous black area in 1b which is more apparent in the second form to be described. Distal to this basal dark area in 3 and 4 are two indistinct ochreous streaks, otherwise the fore-wing is immaculate. Hind-wing with the basal area blackish-brown slightly greyish toward apex of cell; disc of wing with a large ochreous to creamy patch with a diffuse proximal border and a dentate distal edge filling the basal portions of 1c-6 and mid 7. Beyond this a wide brownish-black border carrying a series of submarginal blackish triangular spots slightly joined by a dark angled line. = *damora* f.f. nov.

Type, Kalinzu, W. Ankole, Dec., 1937 (T. H. E. Jackson)
Paratype 1, same data.

Form (b) differs from the above in that the hind-wing patch is white, more defined proximally and more angled into 4 and 5 and thus nearly meeting the submarginal row of dark spots. In the fore-wing the basal black area is more defined and is accentuated distally by a white bar, represented in 1a and 1b by slight streaks, on which a large dark spot is placed, and widest in 2 gradually tapers in 3 and 4, forming a triangle; beyond the cell are two white spots basal in 4 and 5 and slightly present in 6. Beyond this white patch the wing is brownish-black and immaculate. = *amorinda* f.f.

Type, Kalinzu, W. Ankole, Dec., 1937 (T. H. E. Jackson)
Paratypes five same data, and Feb., 1938, Jan., 1938.

Underside: The wings are crossed by a median dark line, straight or almost so across the fore wing, and in the hind-wing slightly angled from the costa to vein 6, then in a straight line toward the hind angle. The basal areas of the wings on the proximal side of this line are greyish-brown with in the fore-wing wavy cross lines through the cell, sub-basal in 1b and beyond this a discal wavy line.

In form (a) there is some white scaling sub-basal in 4-6, beyond the median line the wing is more ochreous-grey, the f.-w. brown with faint whitish shadow marks distal in 1b and 2, while the apex is slightly white scaled. In the hind-wing the ochreous patch is defined proximally but distally it is diffuse and indented by an indistinct post-discal row of arrow marks outwardly shaded with whitish. The border is ochreous-grey-brown.

In form (b) the basal portions of the wings, proximal to the dark median are dark ashy-brown crossed by indistinct wavy lines through the cell and discally. The white areas of above are here present but less defined and more restricted,

and beyond the whitish area in the fore-wing the apex is ochreous grey-brown with a row of darker spots from 2-5, the tip of the wing being whitish scaled.

EARLY STAGES: Unknown.

DISTRIBUTION: This species has been taken by T. H. E. Jackson in the Kalinzu Forest, S.W. Uganda. The second form of female described above bears a strong resemblance to the figure of *hewitsoni* given in Seitz. Pl. 35, but is distinct.

[Confined in my experience to the Kalinzu forest in W. Ankole, where in small local areas it is fairly common. The males behave as do those of *Cy. caenis* and *Cy. h. johnstoni*, choosing a branch usually high up in a sunny patch and chasing each other and fighting for the best vantage points. The females are very weak fliers and easy of capture, but they are protected by a remarkable resemblance on the wing to *Amauris* and certain *Acraeas* such as *Ac. lycoa* whose flight would appear to be mimicked as well.—T.H.E.J.]

The specimens described above were submitted to Mr. G. Talbot, as they presented some difficulty. Mr. Talbot has kindly made a comparison with material in the British Museum, and writes as follows: "Male: this specimen differs slightly from the eleven males in the B.M. Hind-wing: post-discal black scalloped line from veins 2-6 much thinner, and edging the pale discal band from veins 3-6 there is usually a series of dusky spots on the band, of which this specimen shows a remnant in areas 3 and 5. Underside paler than ours, the post-discal lines much thinner; on fore-wing this line at the inner margin is directed outwards whereas in all ours it is straight; also it is slightly waved, but in ours it is quite even; discal crenulate line faintly marked anteriorly, and obsolete below vein 4; in our specimens it is strongly marked throughout. Hind-wing post-discal line waved anteriorly; discal line, as on fore-wing, only marked anteriorly. Both wings with the distal markings weakly defined.

"Female: We have a series of nine; yours differ in certain points: Upperside of f.-w. with the post-discal white patch separated from the spots beyond end of cell; the latter spots in 4 and 5 are narrower; the inner edge of white patch is continued to vein 5, where it meets the distal edge of the somewhat triangular-shaped patch. In typical *indamora* there is a continuous white band, broadening out below vein 3. Hind-wing as in *indamora* except that the post-discal black spots are less distinct. Underside apparently not different from *indamora* in which some variation occurs in the curvature of the post-discal lines limiting the dark proximal areas; on fore-wing, the extent of white scaling beyond the cell, and in the distal area, is also variable.

"The dark female specimen I take to belong to the same species, but we have no specimens like it. It requires a name.

"As these insects are rather variable, the differences indicated in the specimen (male) must be constant to some degree, especially on the underside, in order to say that it represents another form or sub-species."

In a further communication Mr. Talbot states: "The type of *indamora*, a female, came from Calabar. Fore-wing upper-side with inner edge of discal white band only slightly angled at vein 4, and oblique below this vein, so that the white patch in area 2 is narrow and does not reach vein 2; outer edge of band more even than in the eastern race and with no distal projections at veins 2 and 3.

"The male, Oban, Distr., S. Nigeria, differs from eastern race chiefly on fore-wing upper-side; outer edge of discal band sharply defined and, as in *hewitsoni*, separated from the outer curved band. Underside not obviously different, but on hind-wing the discal irregular thin line is very weakly marked."

Cymothoe zenkeri (= *langi*, Holland) occurs together with *indamora* and *hewitsoni* in the Congo and Cameroons. Whether *zenkeri*, *indamora*, and *hewitsoni* are three species seems doubtful. One of our two *hewitsoni* males is from the same area as our Nigeria male of *indamora*, but was caught in June, the others in March.

C. zenkeri, Rich., has *langi*, Holland, and *stetteni*, Bryk., as synonyms. The discal band on both wings is sharply defined. Fore-wing with narrow band not complete, but two sub-apical spots and a lower spot. I have not seen this from Uganda."

CYMOTHOE CYCLADES OCHREATA, Gr.-Sm. Pl. 34, figs. 3-6.

Expanse: Male, 66 mm.; female, 72 mm. Sexes unlike.

MALE: General colour orange with black line on hind wing, and black spots. F.-w.: Ground colour bright orange with only very slight dusky tinge at the base, and with a slight darkening over the distal portion due to the dark colour of below showing through. Apex and margin of wing diffusely dusted with blackish scaling dentate in spaces, and just within this a sub-marginal row of black dots more or less following the contour of the wing to sub-apex.

H.-w.: Ground colour orange, slightly dusky at the base, brownish at the fold. Disc of wing crossed by a black line clear-cut proximally, and more diffuse distally. Two dark marks sub-costal in 7; a double ring and a circle in the cell, and a few dark discal marks. Border of wing dusted with black scales, internal to this, a well-marked zigzag line with black dots in the spaces, and more internal, a shadow line faintly indicated.

Underside: Sandy-ochreous with a grey tinge; fore and hind-wing crossed by a well-marked median band, clear cut proximally and strongly shaded greyish distally. In the fore-wing a series of dentate or tooth lines enclosing dull orange on the proximal side of the median line. A strong black S mark sub-basal in 1b; cell with black-lined marks. The marginal border carries a zigzag shadow line and a series of black dots sub-marginally. H.-w.: Ground colour as fore, slightly more greyish; median line as described, and beyond this, shadow lines and black spots as in fore-wing.

FEMALE: Basal areas to as far as the median line dark-grey-brown and beyond this paler, more whitish especially on the fore-wing dusted over with brownish scaling. On the proximal side of the median line in areas 2-5 of fore-wing are clear-cut white triangles outlined in black. In areas 1a and 1b are large diffuse dark spots on the median line extended up in the other areas as dark angular marks. There is a further row of post-discal arrow marks surrounded by whitish from 1a to the sub-apex. Distal to this is a series of small black submarginal dots, following the contour of the wing.

H.-w.: Basal area as described, but inside the median line in areas 6-7 are two pale whitish marks, and in these same areas but distal to the line are two whitish arrow marks represented in the other areas by dark shadow marks. A series of dark submarginal spots are present from the anal angle to sub-costa in 7, the two upper marks being largest.

Underside: General ground colour of both wings greyish-buff with the dark narrow median line distinct throughout. The white triangles of above are again reproduced. There is also a double dark mark in sub-base of 1a and 1b. The other fore and hind-wing marks are faintly indicated.

EARLY STAGES: Unknown.

DISTRIBUTION: This species occurs in the forests of western Uganda, Budongo, Bugoma.

[Very similar in habits to *Cy. lurida butleri*. I have taken a male feeding on human excrement. It is usually confined to the dense forest regions and its distribution is restricted to the Budongo forest whence it extends into Ituri in the Congo Belge. —T.H.E.J.]

CYMOTHOE BECKERI THEODOSIA, Stgr. Pl. 35, figs. 3 & 4.
Pl. 35a, figs. 1 & 2.

Expanse: Male, 90 mm.; female, 93 mm. Sexes unlike.

MALE: General colour golden yellow with dark hind-wing border. F.-w.: Golden yellow paler in the disc, and dusky shaded along the outer edge of the costa and outer border; fringe

dusky and white spotted. A submarginal row of arrow-shaped dark spots becoming rounded toward apex. Strong markings of lower surface show through above. H.-w. pale creamy-yellow shading to golden just before the dark black-brown border. Fore and hind-wings strongly scalloped with white spots in the incisions, submarginal row of contiguous arrow marks with paler areas at apices submerged in the dark ground of the border.

Underside: A rich rusty-red paler over the discs; apex and a mark from costa to 4 ochreous; cell and areas 1b and 2 with irregular white marks; area 1a mostly white, over proximal two-thirds. Shadow marks present in post-discal area and submarginal marks indistinct.

H.-w.: Rusty-red paler over the disc. Basal area of wing with conspicuous white marks, the outer discal ones being in a row from costa to just above the anal angle. Post-discal shadow marks indistinct; between the outer row and the submarginal angled line are ochreous streaks. Fringe alternately black and white.

FEMALE: General colour black with white spots and a large creamy patch in the hind-wing.

F.-w. mostly black with a bluish suffusion over the base mostly in 1b; central portion of 1a and 1b cream. Cell with two white marks; sub-basal in 2 a large round white spot; a series of three white streaks in a row sub-basal in 6-4, then continued down as white arrow marks through 3-1b. A further row of white marks crosses the post-discal area while there is a conspicuous row of more or less rounded white spots submarginally.

H.-w. with a large cream area filling the centre of the wing; basal area suffused with blue scaling; inner fold of wing blackish continuous with a broad black marginal border, with black extending slightly up the veins. The rows of white spots, one outer post-discal, one submarginal. Most of the spots, with the exception of those in the cell and the three long ones beyond, tinged with bluish distally.

Underside: F.-w greyish with the white markings of above again reproduced but not strongly. H.-w. as fore, but the basal area with a conspicuous white spot at base of 7 and 8; a double black mark in the cell, and a dark bar crossing from the costa to the inner fold, at the discal area. There is also a narrow median line running through the white patch.

EARLY STAGES: Unknown to me.

DISTRIBUTION: This species has been taken in western Uganda in forest. The female of the Uganda form lacks the orange patch in the hind-wing.

CYMOTHOE EGESTA CONFUSA, Auriv. Pl. 35, figs. 1 & 2
Pl. 37, figs. 1 & 2.

Expanse: Male, 65-68 mm.; female, 85-88 mm. Sexes unlike.

MALE: General colour ochreous-yellow with darker hind-wing and yellowish bar.

F.-w.: Ochre-yellow with a greenish suffusion over the base, shading to brown-black 1-3 where the median band is clear-cut proximally. The distal border of the yellow median band is defined by a broad confluent series of arrow marks which lessen in size as they approach the apex. The marginal border is grey-brown and internal to this is a submarginal series of blackish spots, joined by a narrow line in 1a-2, then again in the apex.

H.-w.: Basal area greenish-brown shading to brown-black at the proximal edge of the yellowish median band; this band is widest in 6 and gradually tapers to just above the anal angle which is produced to a point. Distal to the median band is a dark brown-black zone, indented on its outer aspect by a zigzag ochreous line; this in turn is followed by a series of black arrow marks joined together on an ochreous base. The marginal border is grey-brown to olive.

Underside: The ground colour is ochreous strongly suffused with grey especially over the hind-wing. The median line is indicated by a narrow black line outlined distally by ochre. The markings are diffuse except those in the sub-base of 1b and in the cell. The submarginal row of spots are small and black.

FEMALE: General colour dark grey-brown shading to a deeper brown at the cream median bar which crosses both wings from the anal angle then up through the fore-wing to 5. Internally it is sharply defined, but distally in the fore-wing it is bordered by diffuse dark arrow marks. In the hind-wing it is clear-cut. In some specimens there is a pale area above the median band in 6. The wide border of the wing is less dark brown and carries a row of sub-marginal arrow-shaped black marks which follow the contour of the wing and becoming smaller as they reach the apex. The fore-wing cell is crossed by dark wavy lines while there is also a series of dark discal arrow marks from costa to 1b.

Underside: Ground colour ochreous grey, with the median line narrow and internally bordered with brown especially on the hind-wing. The submarginal row of blackish dots is present in both wings but obscured in areas 1a and 1b of the fore-wing. There is a strong circular signet-ring mark in 1b of the fore-wing and less strong marks in and beyond the cell.

EARLY STAGES: Unknown.

DISTRIBUTION: The species occurs in the forests of western Uganda at Katera and Kalinzu and more plentifully in the Kivu

area. It is a ground feeder and is usually seen flying low to the ground with gliding flight, but is not easy of capture. The Kivu specimens are richer than those taken in Uganda, and the ad-marginal ochreous band of the hind-wing is broader.

CYMOTHOE LURIDA BUTLERI, Grunb. Pl. 36, figs. 1-4.
Pl. 37, figs. 3-4.

Expanse: Male, 70 mm.; female, 82 mm. Sexes unlike.

MALE: General colour golden yellow with darker border. F.-w.: Ground colour golden-yellow shaded with olive at the bases, particularly in the hind-wing, with an extension through 1c, fold of wing buffy-grey. Costa of f.-w. narrowly black at edge, widening out toward apex; a brown apical line below the costa, apex and marginal border brownish. Submarginal row of brown arrow marks obscure in 1b, but largest in 3 and 4. Some specimens have a few wavy lines in the cell; such specimens usually have a broader border. Fringe dark brown with white spots in spaces.

H.-w.: Border brown with a shading of the same colour to beyond the row of submarginal arrow marks; these marks may be separate or joined up by a fine line.

Underside: Variable, either brownish-ochreous, or olive ochreous, the wings crossed by a median brown line outlined distally with ochreous, more or less straight from anal projection to 3 then waved or angled and curving inward to mid-point between apex and end of cell. The markings are obscure except the black-lined ones of the cells, one beyond the f.-w. cell, and a circular one in 1b. F.-w. with a zigzag discal line and between this and the upper part of the median line, an ochreous patch extending to the costa. Fore and hind-wings with submarginal blackish arrow marks, and faint post-discal greyish arrow marks. Base of hind-wing with darker basal patch as seen above; cell with two ochreous spots and one at base of 7 and 8.

FEMALE: General colour red-brown with black tip to fore-wing and white sub-apical bar.

F.-w.: Basal half red-brown with dusky shading particularly beyond the cell; cell with distinct irregular red marks outlined with black. Beyond the cell, black, followed by four distinct white triangular marks in the disc outlined in black with an extension of the white into the costa, and continued in 2 as a pale triangular spot or a black angle. Beyond this bar, to the apex the ground colour is black-brown but crossing it are two rows of white triangular spots with black arrow marks centrally, the largest patches being in 2 and 3, smaller in 1b, and with much less white in 4-6. These white spots are con-

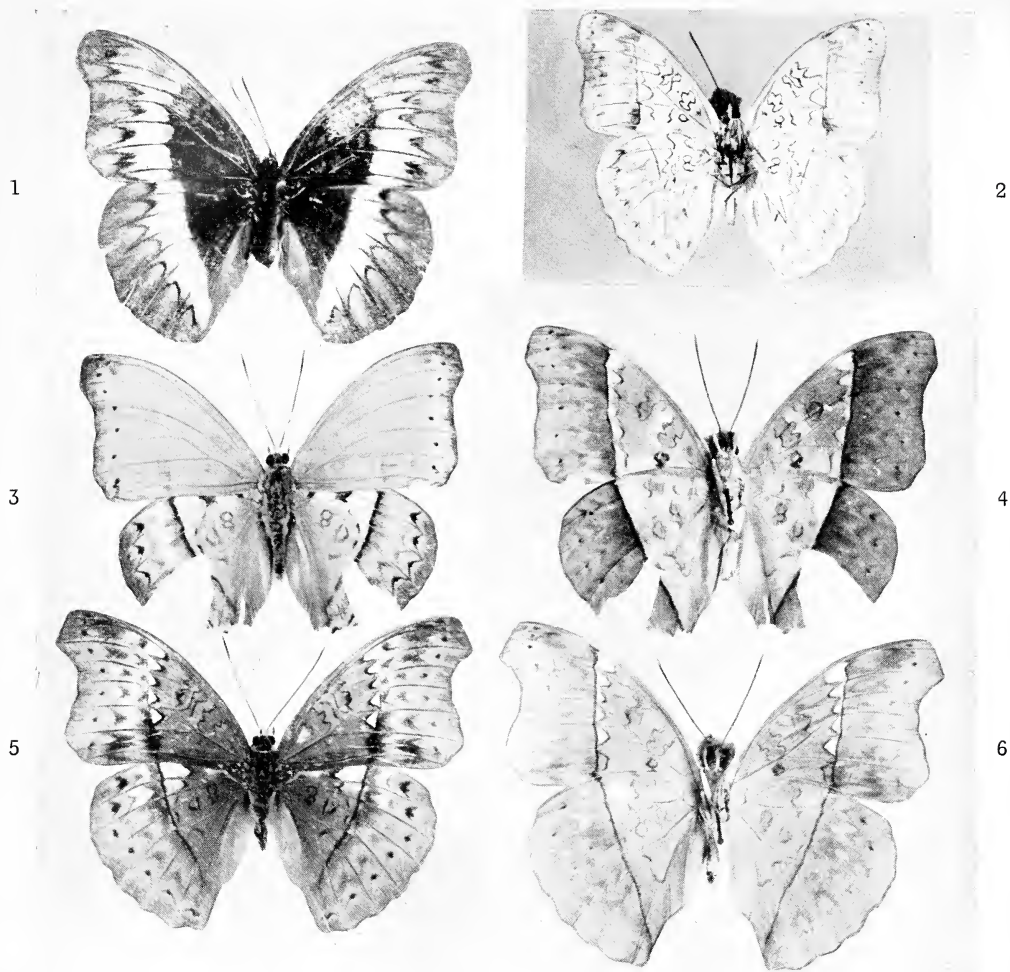
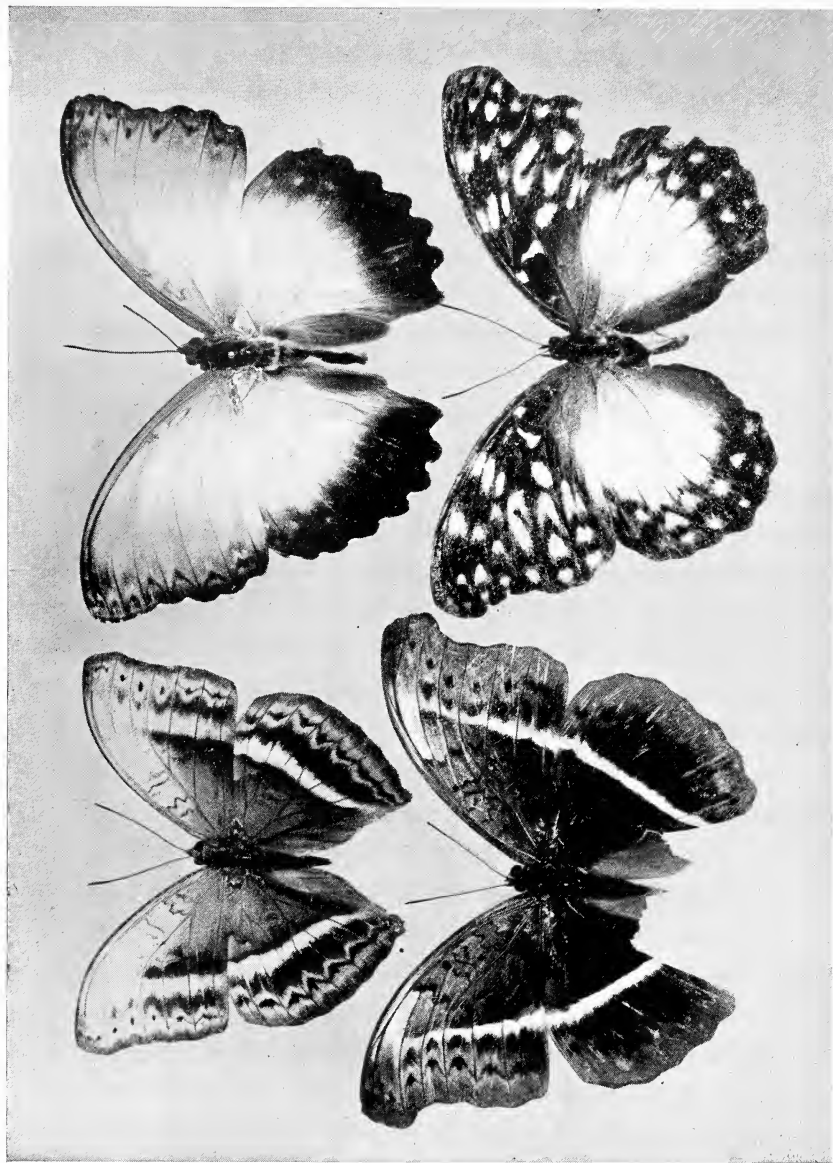


Fig. 1, *Cymothoe herminia johnstoni*, f.f. *budongo*, van. S.

Fig. 2, *Cymothoe coranus*, male, undersurface.

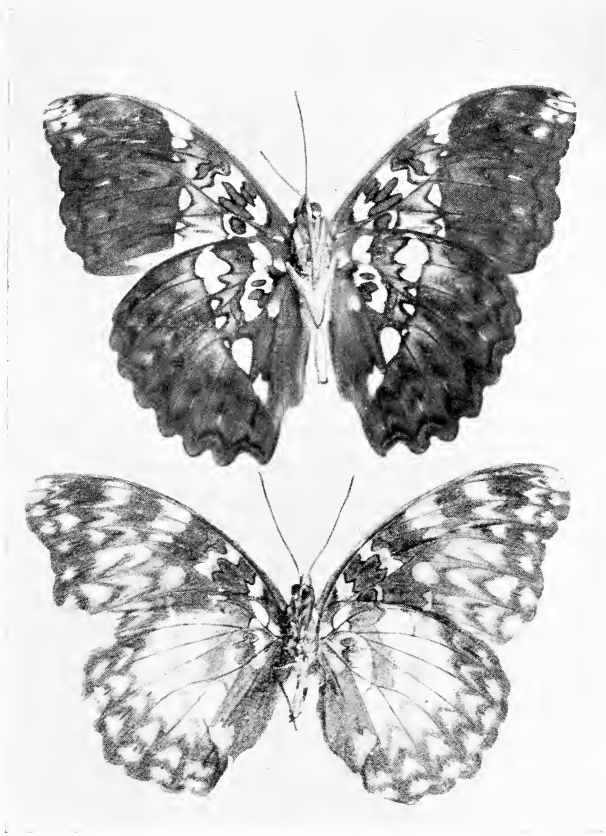
Figs. 3 & 4, *Cymothoe ochreata*, Gr. Smth., male, upper & under surface.

Figs. 5 & 6, *Cymothoe ochreata*, Gr. Smth., female, upper & under surface



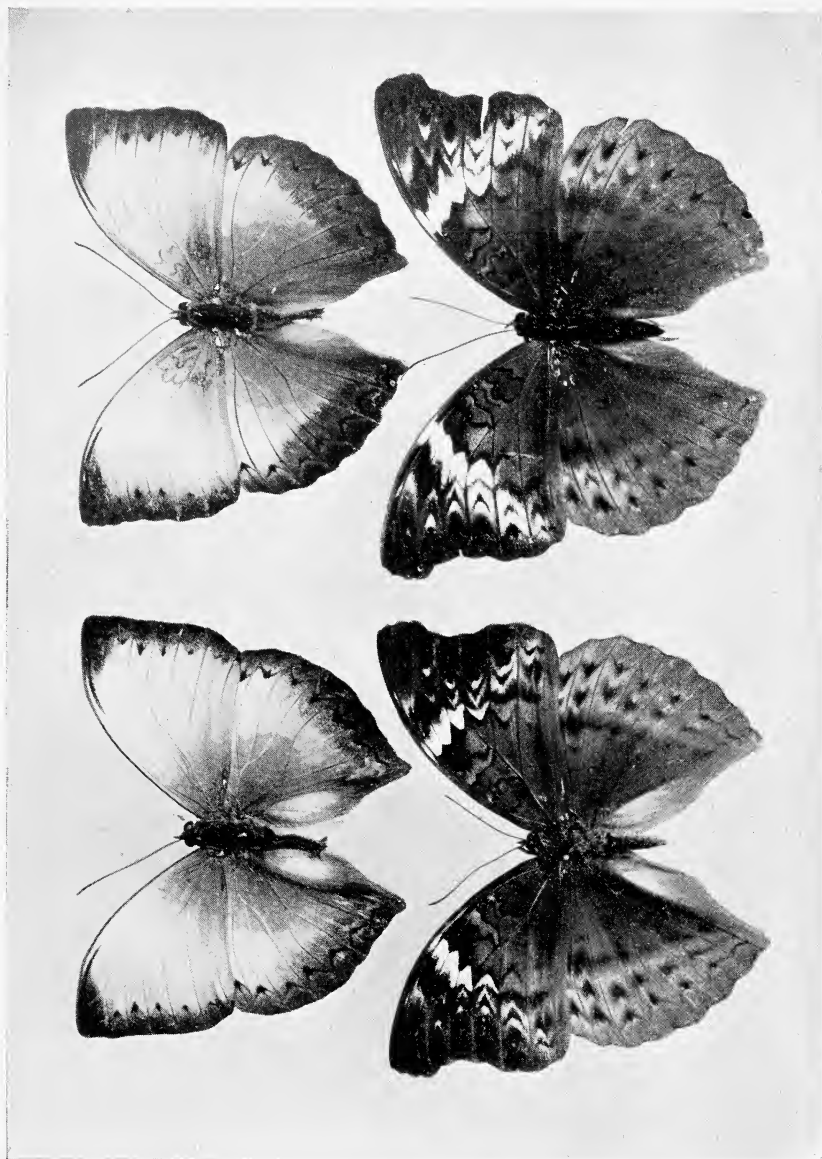
Cymothoe egesta confusa, Auriv. Figs. 1 & 2, male and female.
Cymothoe beckeri theodosia, Auriv. Figs. 3 & 4, male and female.

PLATE 35A



Cymothoe beckeri theodosia, Auriv., under surfaces.

PLATE 36



Cymothoe lurida butleri, Grunb.
Figs. 1 & 2, males. Figs. 3 & 4, females.



Cymothoe lurida butleri, Grunb. Figs. 1 & 2, under surfaces.
Cymothoe egesta confusa, Auriv. Figs. 3 & 4, under surfaces.

tiguous with the discal white bar and form a more or less continuous sub-apical bar across the wing. The submarginal row of black arrow marks, following the contour of the wing, are white tipped. H.-w.: Ground colour red-brown slightly more dusky along the costa and inner margin, and paler distally. Dividing the basal red from the paler area is an obscure series of dusky discal marks largest in 5-7. Beyond this and in these same areas are whitish patches and continuous with them is a series of post-discal dusky shadow arrow marks. The submarginal black arrow marks are distinct and largest in 6 and 7. The fringe is dusky with white spots, increasing in length at the upper angle, and forming a white line.

A variation to the above has the red cell marks of the f.-w. more distinct; but there is a reduction in the white sub-apical bar; in the hind-wing the differentiation between the dark basal area and the paler border is stronger so that the submarginal and post-discal rows of black spots appear more distinctly.

Underside: Variable; either a brownish-grey, olive-grey, or greenish-ochre, with shading of violet-grey toward the apical half of the fore-wing and beyond the median line in the hind-wing. The median line is similar to that in the male, but red-brown, with ochreous, often with a strong shading of dusky-grey distally. The white areas of above are here reproduced, but more indistinctly. The outer border of the h.-w. is shaded with rusty as is also the incised margin of the f.-w. The discal and post-discal markings are ill-defined shadow marks, greyish with white shading. The submarginal spots are small. The inner fold is often strongly pink, or greyish-red.

EARLY STAGES: The eggs of this species are laid on the leaves of *Rinorea* (VIOLACEAE). The egg stage lasts a week to ten days. The larva in second stage is deep sky-blue with black branched spines; the two immediately behind the head, longer. The spiracular line is a vivid scarlet, and below this are short spines, yellow in colour. Head and anal segment yellow. The full-grown larva is longitudinally striped. The dorsum is olive-green shading to sky-blue followed by a broad band of crimson-madder, and below this a yellow fading out to yellowish-white on the ventral surface. This lateral yellow carries short yellow spines. The dorso-lateral line, corresponding to junction of the green with blue, carries long black branched spines; the longest spines are those on the first thoracic segment, and those on the two last segments. The head is bright yellow with black mouth-parts. The last segment is also yellow.

The pupa is deep green, rather paler on the wing-cases. The spiracles are scarlet, outlined with black, the black edging extending slightly to the dorsum. I am indebted to Miss Fountain

for the description of the larva and pupa. Unfortunately the shape of the pupa is not given.

DISTRIBUTION: This species occurs through most of the forests of Uganda, east to the Elgon-Nandi, Kaimosi forests. It is comparatively common, and the males are very conspicuous. In common with others of this group, they frequent the undergrowth and will settle on decaying fruit. The undersurfaces of both male and female are definitely cryptic, for when the insect is at rest with wings folded it is difficult to detect. The flight is low and gliding, but nevertheless swift and the insect is not easy to capture.

[Although found throughout Uganda and extending east to Kavirondo, this species is never much in evidence. Both sexes are shy and retiring, preferring shady places or even dense forest to the more open spaces frequented by the other representatives of the genus. They are difficult to capture. The flight is swift and the insect is very much on the alert.—T.H.E.J.]

CYMOTHOE (Harma) THEOBENE. Dbl. & Hew.

Pl. 38, figs. 1-6. Pl. 38a, figs. 1-4.

Expanse: Male, 50-55 mm.; female, 62-65 mm. Sexes unlike.

Both males and females have the posterior border of the fore-wing incised so that the posterior angle is not rounded.

MALE: General colour dark brown with yellow bar and spots. Bases of fore and hind-wings dark brown shading to orange in the fore-wing and to grey-brown at the fold of the hind-wing; hind and fore-wing crossed by a wide yellow-cream bar, tapered at toward the anal angle and widening out through the fore-wing and reaching the costa, the distal edge in fore-wing strongly shaded with orange. Beyond this band both wings are dark brown, the fore-wing with a series of yellow spots running from below the costa to the hind-angle, with two large spots sub-apical. The hind-wing has a series of sub-marginal yellow spots distally accentuated with a dark line which follows the contour of the wing.

Underside: Both wings ochreous with a dark median line crossing both wings, sharply defined proximally but shaded distally. On the proximal side are a series of contiguous dentate cream spots which widen out toward the inner edge of the hind-wing. The cell of the fore-wing has a reddish irregular bar which carries on into 1b; beyond the cell is another reddish bar, whilst the base of the hind-wing is freckled with red-brown and blackish scaling. The borders of both wings have diffuse ochreous shadow marks and blackish submarginal dots.

FEMALES: Variable, but there are three main forms as follows:

Form A: Mostly white, with darker basal areas and blackish borders. Basal areas of fore and hind-wings suffused with greyish-brown, often with the distal edge accentuated, and clear-cut by a wavy dark-brown line which fades out toward the inner fold of the hind-wing. There are usually two white triangular marks beyond the fore-wing cell followed by one sub-basal in 2. The rest of the wings are white dusted over with greyish scales, border of wing grey-brown more especially at the apex and outer border above hind angle, but the white ground extends into area 5 distally. There is usually a large sagittate dark mark sub-apically, then a more or less continuous series of outer post-discal arrow marks, and a sub-marginal series. The hind-wing is less strongly dark along the border, the widest portion being in the position of the "tail." There are usually two large dark marks in 7, sub-costa followed by a submarginal series, those toward the anal angle being joined by an angled line. There are often two extra dark spots in 4 and 5. Nominate ♀ f. *theobene*.

Underside: Ground colour white slightly pink to violet suffused over the basal areas, the whole heavily stippled with grey scales. The arrangement of the marks are similar to those of the male.

Form B: A variety in which the whole of the upper surface is strongly suffused with brown-grey scales, slightly more reddish at the bases of the wings. The white spots are obscured, but the dark ones appear as a double row through the fore and hind-wings along the outer border. On the hind-wing, however, there is a large quadrate white spot in 7 at about the mid-point. ♀ f. *nigro-lutescens*, Poulton.

Form C: Somewhat similar to B, but the general tone a reddish to tawny-grey. The sub-costal dark marks of the fore-wing more distinct. Nr. ♀ f. *lutescens*, Poulton. There is every combination of these three forms to be found in a long series. ♀ f. *sordida*.

Form D: This represents a very distinct form in which the fore and hind-wing white bar is reduced in width, more or less evenly in the fore-wing to only 3-4 mm., widest in 2, and in the hind-wing it is widest in 6 and then gradually tapers off toward the hind-angle. It is interrupted in 6-7 by two large black semi-quadrangular spots. The reduction in the width of the white band is due to an invasion of the white on the distal border by a considerable increase in marginal black, to enclose the row of dark post-discal spots which are usually free. In the hind-wing there is this same encroachment, but on the other hand the post-discal row of dark spots, usually irregularly defined, are here

represented by large blackish marks distally flecked with white. All the areas which are dark are more blackish than in the nominate female form.

It will be observed then that this form bears a strong superficial resemblance to certain black and white females of *Cy. h. johnstoni*, or to the similarly coloured females of *Euryphura plautilla*.

This distinctive female may be known as *jacksoni* f.f. nov. Named in honour of Mr. T. H. E. Jackson, who obtained the form in Kalinzu forest, western Ankole, Dec., 1937 (van Someren).

Reference to the named female forms of this species will be found in the *Trans. Ent. Soc.*, 1921, pp. 469-472, by Prof. Poulton.

The coastal Kenya race of *theobene* to which the name *blassi*, Weym., may be applied, differs in the male by being less strongly marked with dark brown, thus generally more yellow, with the fore-wing median band wider and less defined distally. On the other hand, the females are much more strongly marked basally, and have a wide dark border; the white area thus stands out as a broad median band. The hind-wing is not "tailed." Pl. 38, figs. 7 and 8.

EARLY STAGES: The eggs are laid on a species of *Rinorea* (VIOLACEAE) and on *Dorvyalis* (FLACOURTACEAE). The adult larva is green with a dorsal dark green line paling toward the line of slightly branched spines which, starting at the first thoracic segment, run the length of the body to the penultimate segment. These spines are black. Below the spiracular line, which is yellowish, are smaller yellowish spines. The pupa is slender but has a strong keel on the abdominal segments, a lesser keel to the thoracic segments, and a marked ridge along the upper edge of the wing-cases. The spiracles are black with a yellow base. The head is only slightly bifid.

DISTRIBUTION: The species is very common throughout the forested areas of Uganda. They are less addicted to the ground level than most of this group. The common form of female is the white one, and this bears a resemblance to *Salamis parhassus*, which is equally common.

The coastal race is, so far as Kenya is concerned, rather a rare species, and my records are for the Rabai Hills and the Ganda Forest. It probably also occurs on the Shimba Hills from which it has been reported by my collectors. The species has also been taken in the Nairobi district in the Karura forest in 1916, but it is very scarce.

This species is subject to occasional migratory movement, but the reason is obscure.

[This is the commonest species of *Cymothoe* in Uganda and in some places, such as around Kampala and again in the S.

Sudan, it is indeed one of the commonest butterflies. Its habits are the same as for most of this group, but being so numerous the females are more in evidence.—[T.H.E.J.]

EUPTERA ELABONTAS, Hew. Pl. 39, figs. 1-4, 1a-4a.
? race *mweruensis*, Neave.

Expanse: Male, 45 mm.; female, 50 mm. Sexes unlike, usually.

MALE: General colour black with creamy or greenish-yellowish marks. F.-w.: Ground colour black; cell with a narrow streak sub-costal followed by two dots and a transverse line or crescent at end of cell; beyond the cell a sub-costal dot with a streak below. Sub-basal in 1a-2 is a yellowish bar; beyond this a wider discal band, narrow in 1a, slightly wider in 1b, widest in 2 and smaller and more distad in 3. In 4 there is a lunate mark with in 5 and 6 angled marks, apices directed inward; sub-marginally there is a streak in 1a, followed by U marks in 1b and 2, then by thicker marks in 3 and 4, then fine ones in 5 and 6. The marks in 1a and 1b are slightly greenish tinged distally.

H.-w.: Ground colour black. A yellowish bar crosses from the mid-costa through the bases of 6 and 5, through the cell and sub-basal in 1c; admarginally is a fine interrupted line following the contour of the wing. A second discal bar crosses from opposite the mid-point of the inner fold in gradually decreasing width toward the upper angle, the spot in 6 set in and small. A sub-marginal series of U marks runs from just above the hind-angle to the upper angle of the wing. There is then a fine admarginal interrupted line from anal angle to upper angle. The thorax has two whitish bars, while the abdomen has two double bars and a terminal dot. Pl. 39, figs. 1 and 4.

The above description fits specimens from the greater part of its range in eastern Uganda, thus agreeing with the characters of the race *mweruensis*, Neave, but two males from Entebbe and one from Mawakota exhibit a much wider discal band (vide Pl. 39, figs. 3 and 6), whilst the spot on the inner fold of h.-w. is large and white, as also the costal spot.

Underside: Ground colour ochreous-grey with a slight greenish tinge toward the margins; with the ground colour of the cell more greyish. The light marks of above are here white but in addition there is a black lined mark in the cell between the two white dots of above, and a triangular black-lined mark at the end of the cell. The white sub-basal marks in 1b and 2 are black lined proximally, while submarginally in 1b and 2 are a large and small black mark; and very small black dots in 3, 5, 6. H.-w.: Ground colour as described; white marks replace the yellow ones of above and in addition there is a series of black dots between

the discal band and the submarginal loop marks, the largest black dot is in 7.

The underside of the variety of male referred to above is more ochreous to rusty and of a stronger colour so that the white dots, lines, and bars show up more distinctly.

FEMALE: This sex occurs in two forms, the usual one being black and white and very *neptis*-like; the other very similar to the male, but larger, and without the prolongation to the anal angle of the hind-wing, thus the wing is more rounded.

Form 1. General colour black and white. F.-w.: Ground colour black, with the white markings arranged as in the male, but those of the cell and along the sub-margin rather obscured, whilst the discal bar is expanded more abruptly from a small streak in 1b to a large 4 mm. mark in 2 slightly smaller in 3, very small in 4, and contiguous with a streak in 5; other marks in 5 and 6 are "crochet hook" in shape. H.-w.: Ground colour black with a white streak at the base, followed by a narrow white bar as in the male, but the discal band wide except at the inner fold and 7 and slightly tapering toward the upper angle. The submarginal white line is not very distinct, but between this and the admarginal line the ground colour is blacker. The thoracic and abdominal bars are as in the male, but white. Underside very similar to the male but both white and black marks larger.

This can be taken as representing the dominant form. Pl. 39, figs. 4 and 8.

Form 2. Male like, that is, with a strong pattern of light marks on a black-brown ground, the light marks being cream, and larger than in the male, but otherwise similar. A point of difference lies in the fact that the ground colour is browner; nevertheless, practically all the lines, angles, and spots are accentuated by black on the proximal side. This may be known as *primitiva*, f.f. nov. Type, Katera, Oct., 1935 (T. H. E. Jackson). Pl. 39, figs. 2 and 7.

EARLY STAGES: We have not examined the eggs of this species, but larvae have been taken on a plant, not yet identified. They conform to the general shape of many of this group, being dull green with long feathery lateral spines rather paler in colour, those of the first thoracic and sub-terminal segments being longest. The first two thoracic spines are slightly brownish at the bases. When not feeding, the larva lies along the mid-rib of the leaf, usually on the underside, with the lateral spines pressed close to the surface, so that it becomes practically invisible. When it has attached itself for pupation the head is curled up toward the abdomen, and the lateral spines are brought forward and meet. The larva gradually loses its

full green colour and becomes a semi-translucent greyish-green. The skin is cast within 24 hours of suspension.

The pupa is pale green with a semi-glazed surface, the abdominal segments strongly ventricose, with very small black spots on the spiracles, and considerable angling of the third segment dorsally, the ridge being carried forward to meet the posterior angles of the wing scutae. The other abdominal segments are slightly ridged.

There is a slight constriction between the posterior angles of the wings over the segments scutella, then an expansion over the "shoulders" in the form of a ridge and terminal spine, and forward of this the ridge runs into the bifid horns of the head. The abdominal ridge and ala spines are yellowish to brown. There is very little veination of the wing scutes. The pupa stage lasts three weeks to a month under favourable conditions, but some may carry over for a longer period.

DISTRIBUTION: From the Kaimosi-Kakamega forests throughout the eastern portions of Uganda to Mawakota. It is a forest species. The female of the dominant type is a wonderful mimic of some of the larger *Neptis*.

[The males of this interesting genus are found in sunny patches in the forest, often several together, but each choosing a separate branch from which to take short flights to chase away each other or any other insect which may encroach too near their stance. The flight is rapid but they are comparatively easy to capture when settled, for they are bold and will even attempt to "chase" a moving net when raised too close to them. Females are usually taken before the sun becomes too hot, flying low along a road or path, or feeding on fruits or moisture. It is this difference in flight and habits which enables one to differentiate between them and *Neptis*.—T.H.E.J.]

*EUPTERA HIRUNDO RUF*A, J. & T. Pl. 40, figs. 1 & 2.

Pl. 41, figs. 1 & 2.

Expanse: Male, 40 mm.; female, 45 mm. Sexes unlike.

MALE: General colour black with greenish-cream markings. F.-w.: Ground colour intense black. Cell with a sub-costal streak at the base, followed by a "comma" mark, then by two transverse lines and a broken angle at end of cell. Beyond this are two longitudinal streaks, with a dot in 6. Sub-basal in 1b and 2 and basal in 3 are angled marks and a dot. A discal band widest in 1a crosses to 1b, then in 2 and 3 is represented by discreet spots, that in 2 being oblique and that in 3 small; this band is then represented in 4-6 by small dots. There is a submarginal series of V or U marks from 1a-4, then faint in 5, more distinct in 6.

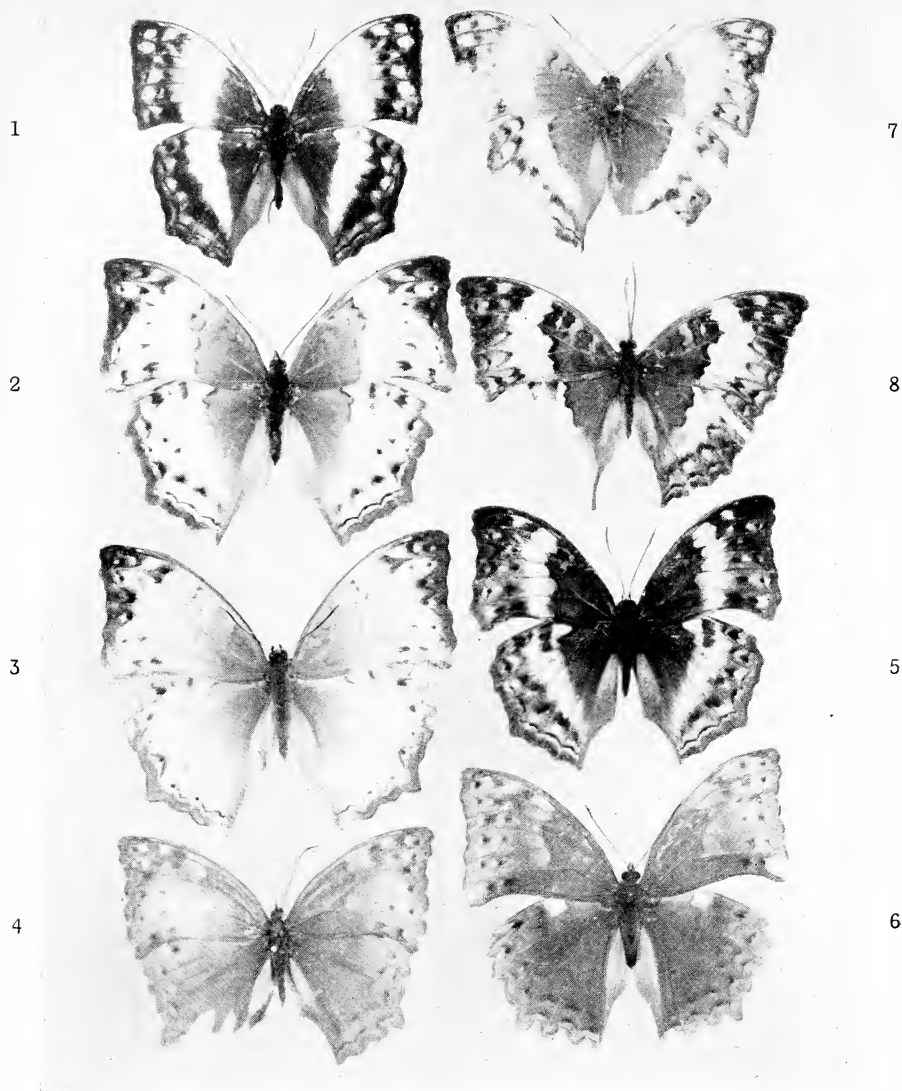
H.-w. more brown-black especially along the costa, marginal border and inner fold. There is slight transverse green scaling in the cell and a small white dot above. The discal band is triangular in outline, represented basally as a long line in 1c thence tapering rapidly to a small spot in 6. Beyond this band are small spots post-discal in 4-6. A series of lunate or U marks run submarginally from the upper angle to the "tail" or anal angle where the line becomes straight.

The thorax is crossed by two interrupted bands and a line over the scutellum. The abdomen has a large patch covering most of the segments except the basal three. All the light marks on the wings and body are greenish-cream.

Underside: Quite different to the upper surface and giving the appearance of a *Precis*. Ground colour grey-brown, darker over the basal portions and more brownish on the borders. Cell with a black-lined mark; at end of cell two black lines shaded outwardly with whitish; beyond, a double whitish angled mark in 5 and 6. A black mark sub-basal in 1b; distad to this and crossing the sub-bases of 2 and 3 an indistinct brownish line, and distal to this the ground colour is more greyish, in a bar up to the costa; the submarginal U marks of above are slightly indicated but each has a black dot, those in 5 and 6-7 with white proximally. The apex of the wing carries two white marks. H.-w.: Ground colour as fore. The brown line of the fore-wing is continued down through the hind-wing in a zig-zag passing sub-basal in 7-6-5, base of 4, then inwardly curved and then straight along the inner fold.

FEMALE: The only female form which we possess is *rufa*, J. & T. General colour dark brown-black with wide band across fore and hind-wing. F.-w. cell to just beyond, the basal portion of 1a and 1b the extreme bases of 2 and 3-4-6 black brown sharply cut from the discal orange-ochreous band. Cell with one longitudinal basicostal line followed by a triangular creamy spot, then by two transverse lines and one angled line beyond cell, all outlined proximally in black. The discal band is wide and extends from the mid-portion of 1a-6; it is widest in 2 and tapers off in 6. Within the distal ends of this band are black spots, large in 1b, then of uniform size to the costa. Within this series, in 5-7 are white dots. The dentate outer border of the band is outlined in black.

H.-w: Basal portion black-brown, straight for its greater length then angled up toward the costa in 7. Beyond this a wide creamy to orange band with on its distal border a series of black spots outlined distally with ochreous and followed by a black bordering which stands out from the blackish-brown of the border.



Cymothoe (Harma) theobene.

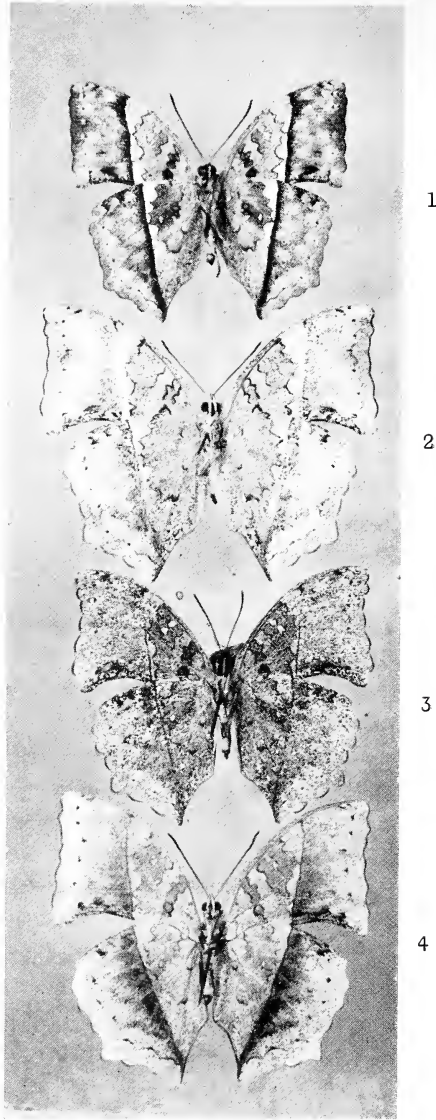
Fig. 1, male. Figs. 2 & 3, nominotypical females.

Fig. 4, f.f. *lutescens*, Poulton.

Fig. 5, f.f. *jacksoni*, f. nov., van. S.

Fig. 6, f.f. *nigrolutescens*, Poulton.

Figs. 7 & 8, *Cy. theobene blassi*, Weym. Kenya coast, male and female.



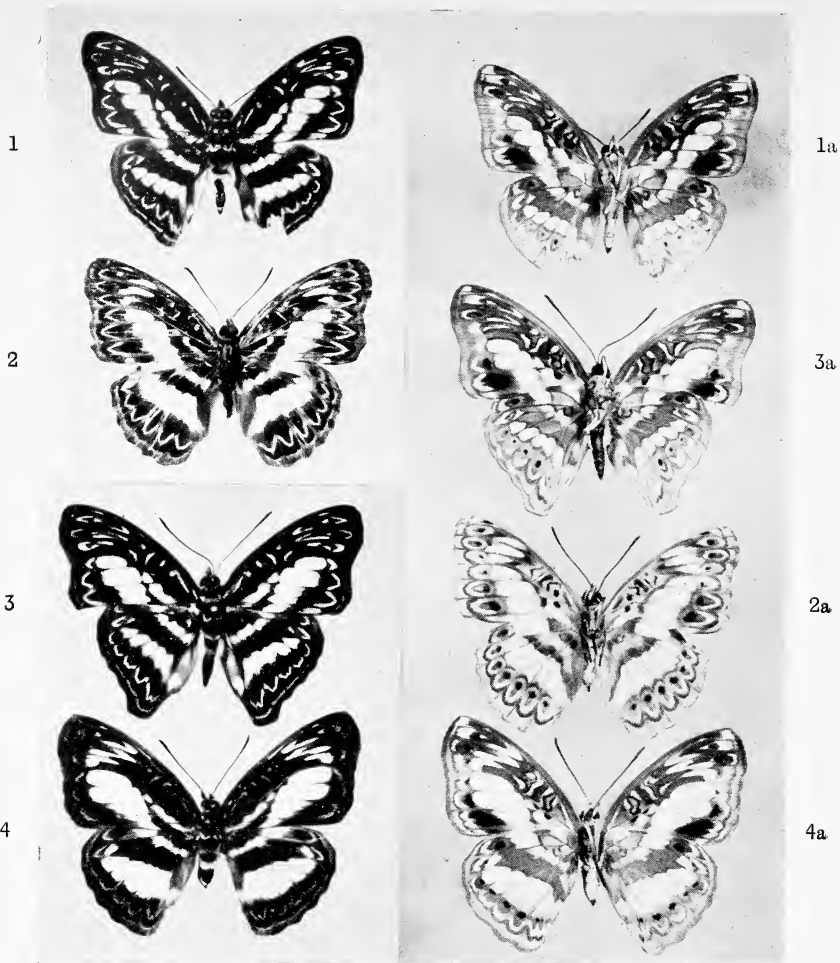
Cymothoe theobene, Dbl. & Hew.
Under surfaces.

Fig. 1, male.

Fig. 2, typical female.

Fig. 3, f.f. *jacksoni*, van. S.

Fig. 4, f.f. *nigrolutescens*.



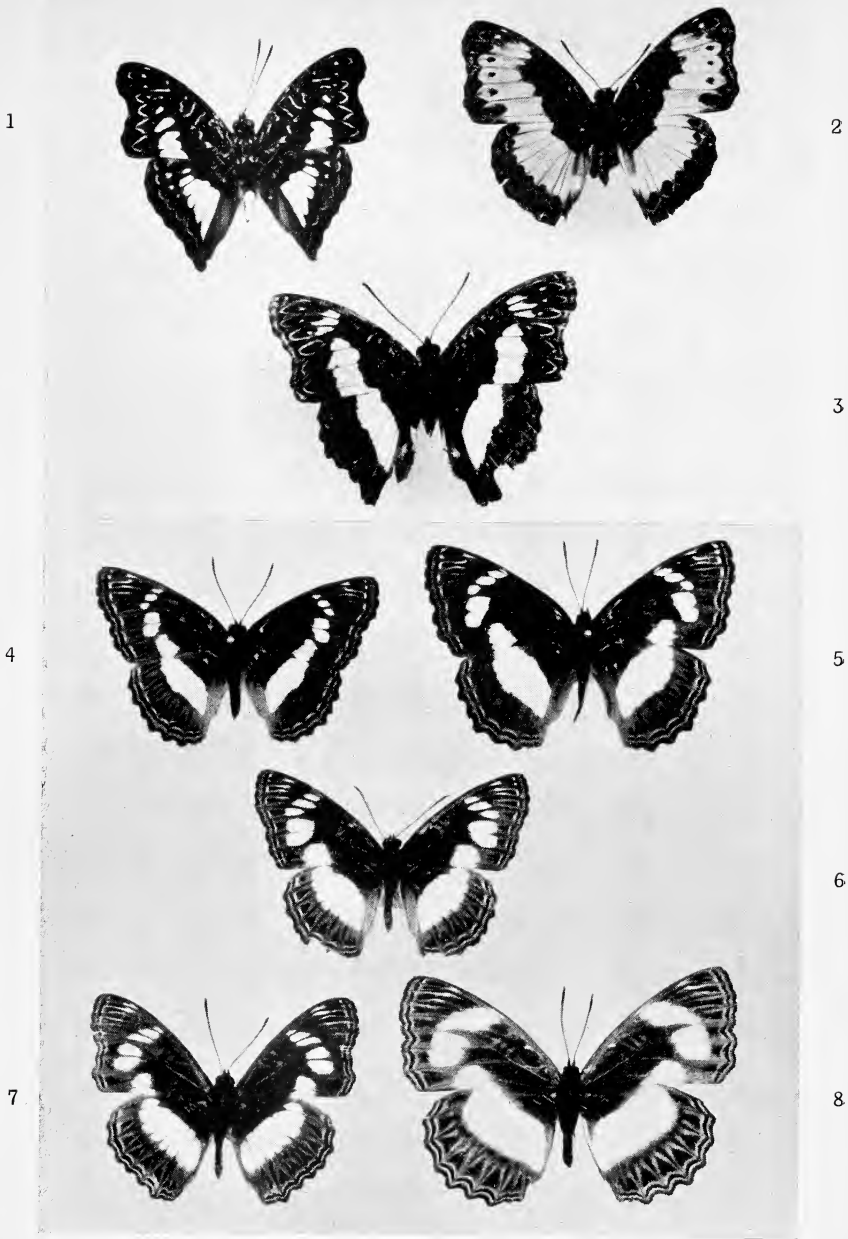
Euptera elabontas ? *mweruensis*, Neave.

Figs. 1, 3, 1a, 3a, males, upper and under surfaces.

Figs. 2, 2a, f.f. *primitiva* f. nov., van S.

Figs. 4, 4a, nominotypical female.

PLATE 40



Euptera hirundo rufa, J. & T. Figs. 1 & 2, male and female.

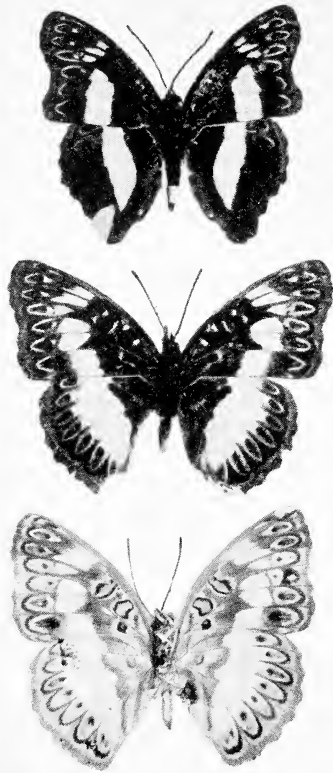
Euptera pluto kinugnana, Smith, fig. 3, male.

Pseudathyma plutonica, Btlr. Fig. 6, male.

Pseudathyma nzoia, Sp. nov., van. S. Figs. 4 & 5.

Pseudathyma callina, Smith. Figs. 7 & 8, male and female.

PLATE 40a.

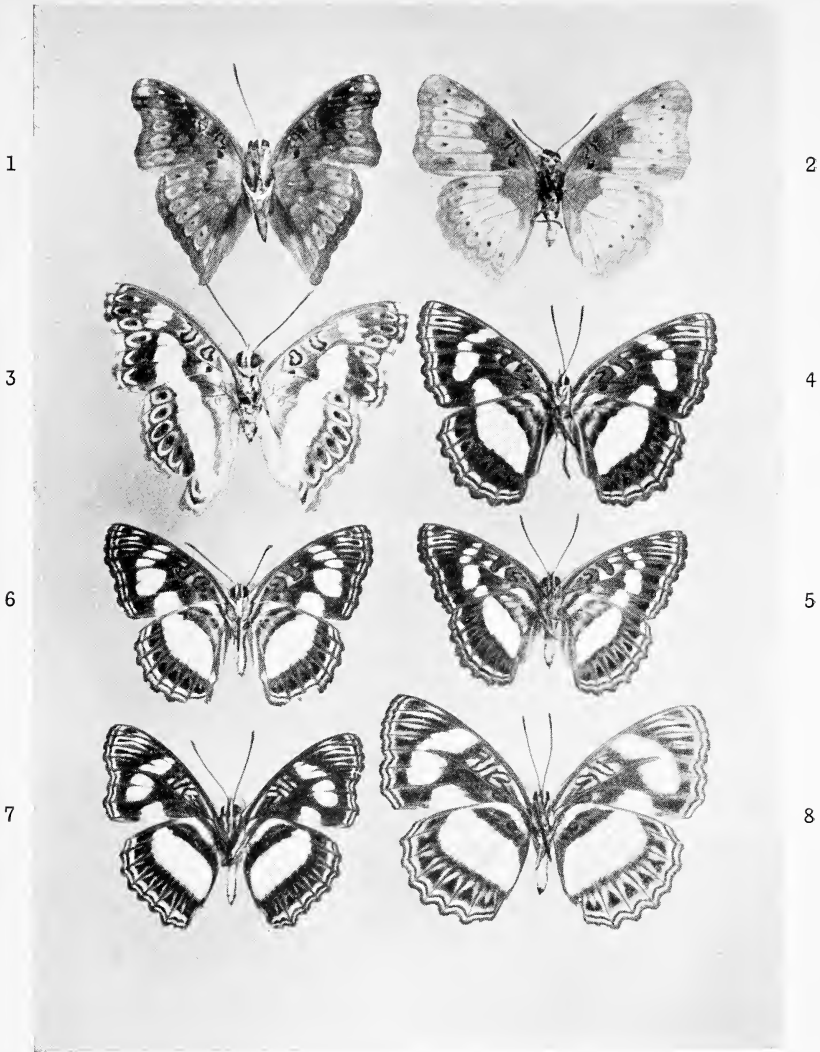


Euptera kinugnana, Smith.

Fig. 1. Male.

Figs. 2 and 3. Female.

PLATE 41



Euptera hirundo rufa, J. & T. Figs. 1 & 2, under surfaces.
Euptera pluto kinugnana, Smith. Fig. 3, under surface.
Pseudathyma nzoia, van S. Figs. 4 & 5, under surfaces.
Pseudathyma plutonica, Btlr. Fig. 6, under surface.
Pseudathyma callina, Smith. Figs. 7 & 8.



Underside: Basal areas grey-ochreous as also the apex and border. In the fore-wing the cell marks are brown; sub-basal in 1b is a black spot; the discal bar is as above, ochreous and the black spots of above are here as blackish dots. H.-w.: Basal area grey-ochre at the base and border; discal band ochreous with a darker shading distally. Black spots of above here as black dots. Submarginal lunate marks indicated and pale edged internally.

EARLY STAGES: Unknown to me.

DISTRIBUTION: This species has a more western range than the preceding species extending to Malabigambo forest at Katera in N.W. Lake Victoria region. It has not been taken from Kavirondo, but from Mawakota east to Jinja.

The female described is a wonderful mimic of certain *Precis* such as *P. millonia rauana*.

EUPTERA PLUTO KINUGNANA, Smith. Pl. 40, fig. 3.

Pl. 40a, figs. 1-3. Pl. 41, fig. 3.

Expanse: Male, 45-48 mm. Female, 46-50 mm.

MALE: General colour black with cream bars and lines.

F.-w.: Black-brown; cell with a sub-basal-costal longitudinal streak followed by two transverse lines and two small dots beyond the cell. A discal yellowish-cream band starts at about mid- 1a, 4 mm. wide passes through 1b, 2, and narrows in 3. Above this band are three semi-arrow marks forming a sub-apical bar, and beyond this small white spots in 3-6. There is a series of U submarginal lines with the enclosed areas black, and outlined with black; there is then an admarginal interrupted line following the contour of the wing from the hind-angle to the apex.

H.-w.: Basal area black, with more brown-black extending down the inner fold; marginal border brown-black carrying a series of U to complete ovate marks enclosing jet black and outwardly bordered by the submarginal black line; beyond and admarginally an interrupted paler line.

Underside: Strongly reminiscent of *Neptis saclava*. Ground colour ochreous with a greyish tinge particularly distally. The cell with two black-lined marks outlined with whitish; sub-basal in 1b a black spot broadly outlined in white; discal band white and as above; sub-apical bar as above but white; a series of black marks, large in 1b and 2, submarginally, outlined distally in the first two and encircled in the other areas with white and enclosing some ochreous ground. Admarginal interrupted line white.

H.-w.: Ground colour ochreous to greyish distally. Basal area with a forked white bar with the outer prong extending into 6 basally. The cell with a circular brown mark; the discal

band white and crossing the wing from mid-costa to just above the anal angle. Submarginally there is a series of ovate white circles enclosing black dots on the ochreous ground, the black dots set eccentrically and proximal. On the admargin an interrupted white line following the wing contour.

FEMALE: General colour black and white. Ground colour blackish-brown crossed by an interrupted white discal band. This band, in areas 1a-1b, at about mid-point consists of rectangular white spots, followed in areas 2 and 3 by more triangular marks set slightly out, especially in 2, followed by a small triangular mark in 4, then by two long marks in 5 and 6. Distad to the band is a series of white dots from 2-7 followed by a series of fine white-line loops enclosing black areas and accentuated distally by black lunate marks. The cell contains two subcostal white dots outlined in black and toward its apex are two white lines outlined with black. H.-w.: Basal portion blackish followed by a wide white discal band with an irregular inner edge, and outwardly bordered by a series of ovoid white marks enclosing black areas, and distally accentuated by black. The cell is crossed by an ill-defined white line.

Underside: Base of wings with rusty scaling and grey-brown especially along the proximal edge of the fore-wing white bar. The cell has two black-lined marks accentuated outwardly with white; the base of 1b has a black circular mark outlined with white. The discal white band is as above, both in fore and hind-wing, whilst the series of ovoid marks on the distal border are more generally white with black dots at their proximal ends and strongly outlined on the distal edge with brown-black; beyond this series, the ground is whitish shading to rusty on the margin of the wing especially toward the anal angle of the hind wing and toward the apex of the fore-wing. The ovoid spot in the distal portion of area 1b in the fore-wing is largely black-centred, forming an "eye."

EARLY STAGES: Unknown to me.

DISTRIBUTION: Within our boundaries this species is confined to the forests of the coast, Vanga (Ganda forest), Shimba hills, and Rabai hills, north to Sekoke. They have the same habits as the other species of the genus.

PSEUDATHYMA PLUTONICA, Btlr. Pl. 40, fig. 6.

Pl. 41, fig. 6.

Expanse: Male: 40-42 mm.; female slightly larger. Sexes somewhat alike.

MALE: F.-w.: Ground colour black-brown; cell with one basal angle, followed by three transverse black lines, ground slightly paler between line two and three. Discal band inter-

rupted; a large spot mid in 1a and 1b, then two large contiguous spots set distad in 2 and 3, followed by three white spots sub-basal in 4-6 set in a line toward the costa. Beyond this a series of black triangular marks, apices inward, the upper ones in 5-7 outlined in white, the others with white at base of triangle, thus distally, and contiguous with a double line black and white, the black proximal. Wing fringe with white dots internervularly. H.-w.: Ground colour brown-black crossed by a wide discal band whose proximal edge is curved from the inner fold to about mid-costa, with the distal edge slightly scalloped and convex, the longest bars being in 5, so that the whole has the appearance of tapering at both ends. Beyond this band is a series of triangular black marks bordered distally by two white and a black line between; the wing fringe dark with white lunates.

Underside: Ground colour ashy grey-brownish tinged with slight rusty tone to the margins and in the cell marks. Cell with marks as above but area between line 2 and 3 whitish. A black spot basal in 1b. Other dark and light marks as above, but admarginal white lines more pronounced and intermediate one less so. H.-w.: Ground colour as above with white markings similar, but more pronounced; the basal area crossed by two ill-defined bands; submarginal and admarginal marks of above conspicuously reproduced below. I have described the light markings above and below as white, but in fresh examples they are really apple-green. This colour soon fades out.

FEMALE: This sex is larger and somewhat similar to the male.

EARLY STAGES: Unknown to me.

DISTRIBUTION: Was originally described from Toro and has since been taken by Jackson in Kakamega and Kampala, westward to Kamengo and Kalinzu.

[Both sexes where they occur are found flying low along paths and roads through the forests, or feeding on decaying fruits and damp mud. During the hotter parts of the day they retire to the forest shade. They are perfect mimics of *Neptis*, in both sexes.—T.H.E.J.]

PSEUDATHYMA NZOIA, sp. nov. Pl. 40, figs. 4 and 5.

Pl. 41, figs. 4 and 5.

Expanse: Male, 40-42 mm.; female, 50-52 mm. Sexes somewhat similar. General colour black and white and resembling *Neptis* ssp.

MALE: F.-w.: Ground colour black-brown; cell with a dark basal area outlined distally with deeper black, followed by a lighter bar, then a further dark bar outlined in black. The discal band is much narrower than in *plutonica* (being only $2\frac{1}{2}$

mm. as against 4 in the nominate race) and starting at mid 1a, extends into 1b where the spot is distinctly indented on the proximal and upper side so as to give an inward kink. The spots in 2 and 3 set more distad are here also much smaller, the upper one not approaching the lower vein of the cell nearly so close as in *plutonica*. The spot in 4 is very small whilst those of 5 and 6, smaller than in *plutonica*, are not elongate. The other lines and marks are as in that species but less marked whilst the submarginal loop in 6 is laterally constricted.

H.-w.: Ground colour as fore; discal band much narrower than in *plutonica*; less curved on the proximal edge, but with a distinct angle on the distal edge at 4. Furthermore the outer edge is less scalloped, more regular, as the black ground does not extend up the veins. The other marks are as in *plutonica*.

All the pale marks are strongly apple-green when fresh and fade out to a creamy opaque white. This green colour is much more evident in this species than in any other.

FEMALE: The remarks regarding restriction in size of the light spots, here always white, described in the male, hold good in this sex also; more particularly is this the case in respect to the white areas in the fore-wing; moreover the two spots in 2 and 3 are more distad while that in 4 is very small.

On the undersides of both sexes the ground colour is a richer brown, not so tinged with grey, whilst the submarginal black triangles in both fore and hind-wings are longer and more pronounced.

EARLY STAGES: We have bred this species out in very considerable numbers. The larva, first grey-green, turns dull green at the first moult, then brighter green in the next stages, though the abdominal segments are darker than the thoracic.

The head is yellowish, each segment from the second to the anal is furnished on the dorso-lateral aspect with a long feathered filamentous spine, longest anteriorly and posteriorly, slightly less green than the body. There is a blue dot on the dorso-lateral part of the first segment. As is common with larvae of this group, one finds them flattened out along the lower surfaces of the leaves and they are then difficult to detect. The pupa is semi-glazed, pale green in colour, with a slight transverse ridge on the third abdominal segment terminating in a sharp spine before which is a gold spot. There is also a slight longitudinal ridging on the other posterior abdominal segments with short spines. The ridges and spines are ochreous yellow, this colour extending across the third segment and as a triangle or dome shape on the fourth and on the spines of the other segments. The abdomen is strongly ventricose. The thoracic segments are longitudinally ridged, but not sharply. There is a restriction

at the junction of the thoracic-abdominal segments reflected in the upper edge of the wing cases then an expansion to the "shoulder spines" which are black. There are black spines on the bifid head, two black dots on the fore-part of the thorax and two more on the scutellum. The ventral surface is immaculate.

DISTRIBUTION: The limitations of this insect are from the Elgon-Kitale district south to Nandi and Kavirondo and again in Kalinzu. It is everywhere rather rare, although just after an emergence several may be noted. This insect is here described as a species on account of the very distinct arrangement of the white spots and the general different colouration above and below; furthermore, there is a marked overlap in the distribution of this and *plutonica*, for both occur throughout the range of the other. Vide distribution note.

Types, male and female, Kitale, Oct., 1932, bred van Someren. Paratypes, seven males and seven females, same data. In my collection; four specimens, Jackson coll. from Elgon, Kakamega, and Kalinzu.

PSEUDATHYMA CALLINA, Smith. Pl. 40, figs. 7 and 8.
Pl. 41, figs. 7 and 8.

Expanse: Male, 42 mm.; female, 53 mm. Sexes somewhat similar.

MALE: General colour black and white. F.-w.: Ground colour black-brown, cell with an angled sub-basal mark followed by three black transverse lines; sub-base of 6-4 with white longitudinal streaks, small in 6 and longest in 4, these forming a continuation of the white discal band which commencing in 1a, where it is widest, 3 mm., is continued in 1b where the spot is somewhat triangular, apex forward, then in 2 and 3, but these spots are set distad to the first two, separated from them, and somewhat pear-shaped. (There is a marked similarity to the western *plutonica*, but the shape of the spots in 2, 3, and 4 is different.) There is a series of triangular black submarginal marks, bases outward, from 1b-4, becoming elongate beyond, distally bounded by two parallel white lines separated by a black line, and extending admarginally from the hind angle to the apex. The black sub-apical marks are partially enclosed in a narrow white border.

H.-W.: Ground colour black-brown; disc of wing crossed by a white band, almost straight for its greater length on the proximal edge, except where it stops short of the inner fold, and below the costa. (It is thus less curved than in *plutonica*). On the distal border it is curved in 7-6 then almost straight, but indented by the extension of the blackish ground along the veins, until the inner fold where it curves upward. It extends

further into the inner fold than in *plutonica*, reaching 1b. The submarginal triangular black marks are well marked and extend from the hind-angle to the upper angle where they are more elongate in 6 and 7, and thus differ from *plutonica*.

The admarginal double white line, with black between, is strongly marked.

Underside: Black brown, with a greyish tinge; cell with a sub-costal basal whitish streak, followed by an inverted, double lined V in black with whitish enclosed, followed by a whitish transverse bar, then by a double lined transverse bar in black with whitish in between, and two whitish spots beyond, sub-basal in 1b is a black crescentic mark. The discal band and the white marks in 4-6 are as above. The submarginal black marks are here represented by a large ovoid mark in 1b, more quadrate in 2 and 3, then elongate in 4-6, those in 5 and 6 outlined except proximally, with white. The admarginal white and black lines are well marked, and the white marks on the fringe stand out clearly. H.-w.: Ground colour as fore, base of wing with a basi-costal white line, only one curved line crosses the dark area, the second, seen in *plutonica*, is only slightly indicated by a few white scales. Cell with a black ring mark. Discal band as above, but shaded on its distal edge with blackish. The submarginal black triangles well defined and accentuated by white outline not meeting at apex but broad on the base, followed by an admarginal white line. Wing fringe with conspicuous white internervularly. Apart from the detailed differences cited above, between this species and *plutonica*, with which it might be confused, the whole underside has a more black and white appearance, less brownish than in the latter.

FEMALE: Ground-colour less blackish than the male. F.-w: Cell marks and other pattern as in the male, with the exception of the discal bar; the marks in 1a and 1b taken together form a blunt triangle; the next two spots are more as in the male, but those of 4-6 are more generally elongate especially the sub-costal, so that there is less tapering off toward the costa. Hind-wing pattern as in the male, but larger throughout and with less of a break along the proximal edge in 7.

Underside: Generally similar to that of the male but larger and the ground colour more brownish.

EARLY STAGES: Unknown to me.

DISTRIBUTION: Hitherto only taken within the boundaries dealt with, in the Kalinzu and Budongo Forests of Uganda, and apparently very scarce, for Mr. Jackson's collectors have only turned up two males and three females. The habits are similar to those of others of this genus.

(To be continued.)



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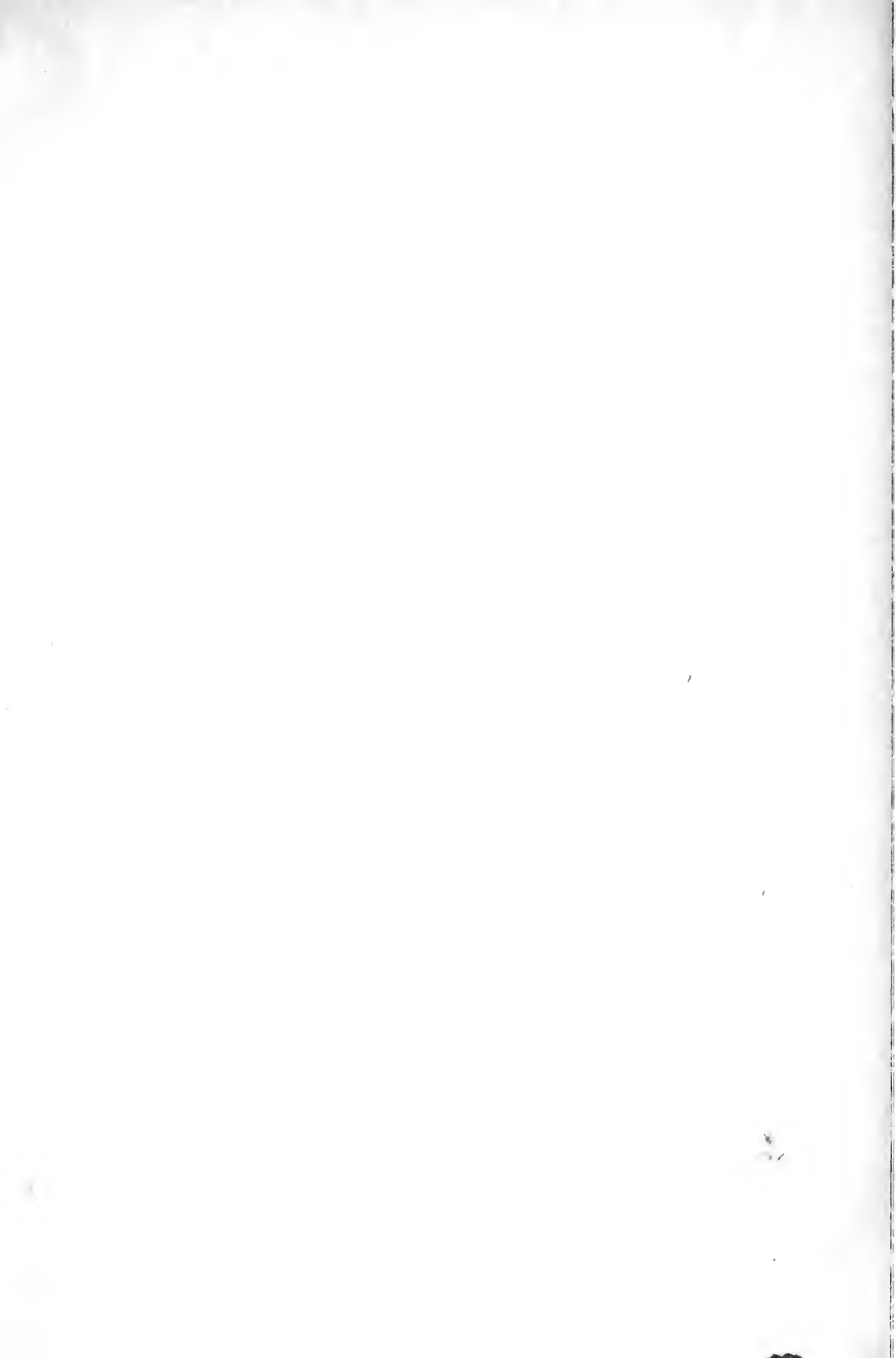
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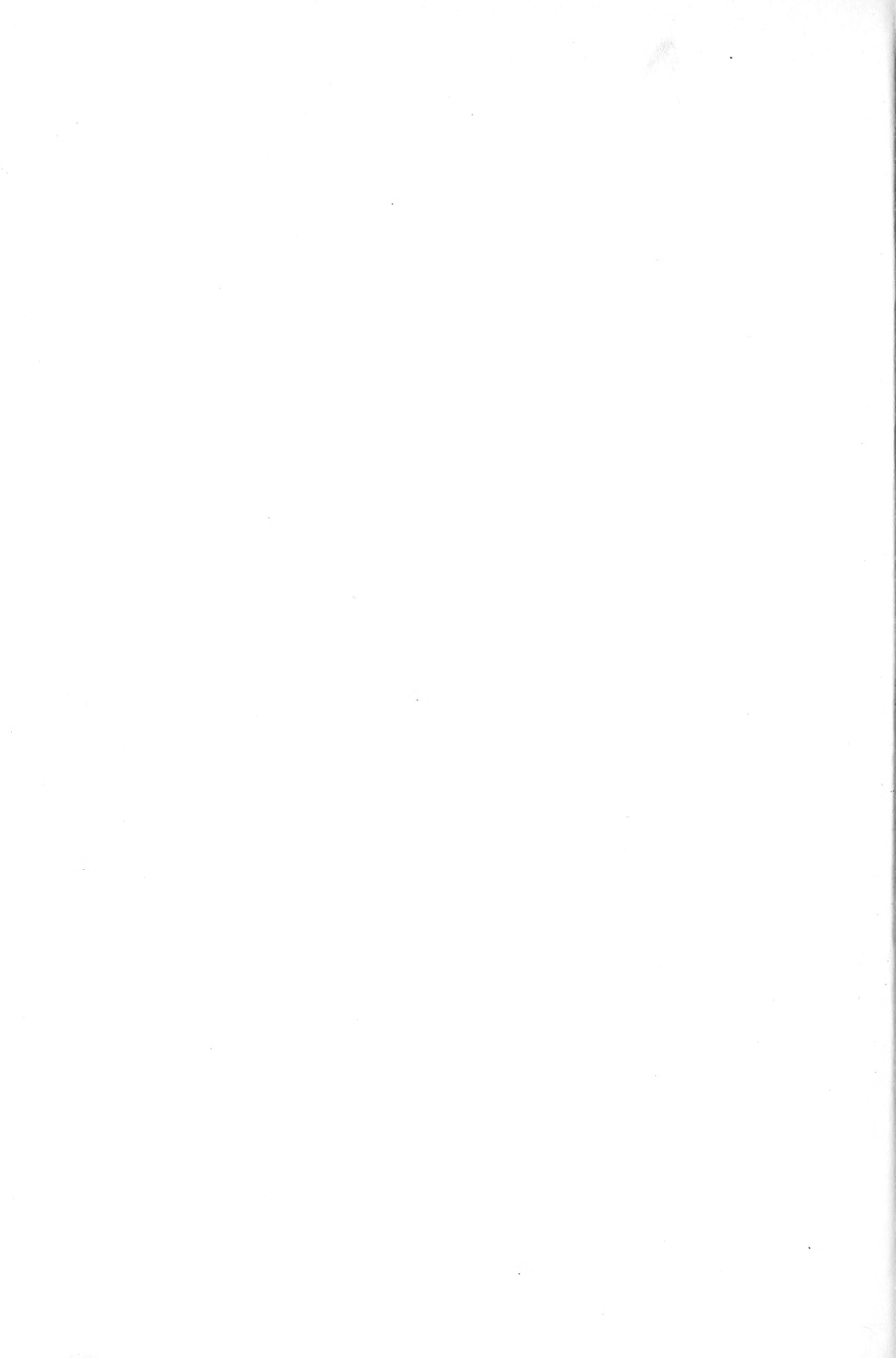
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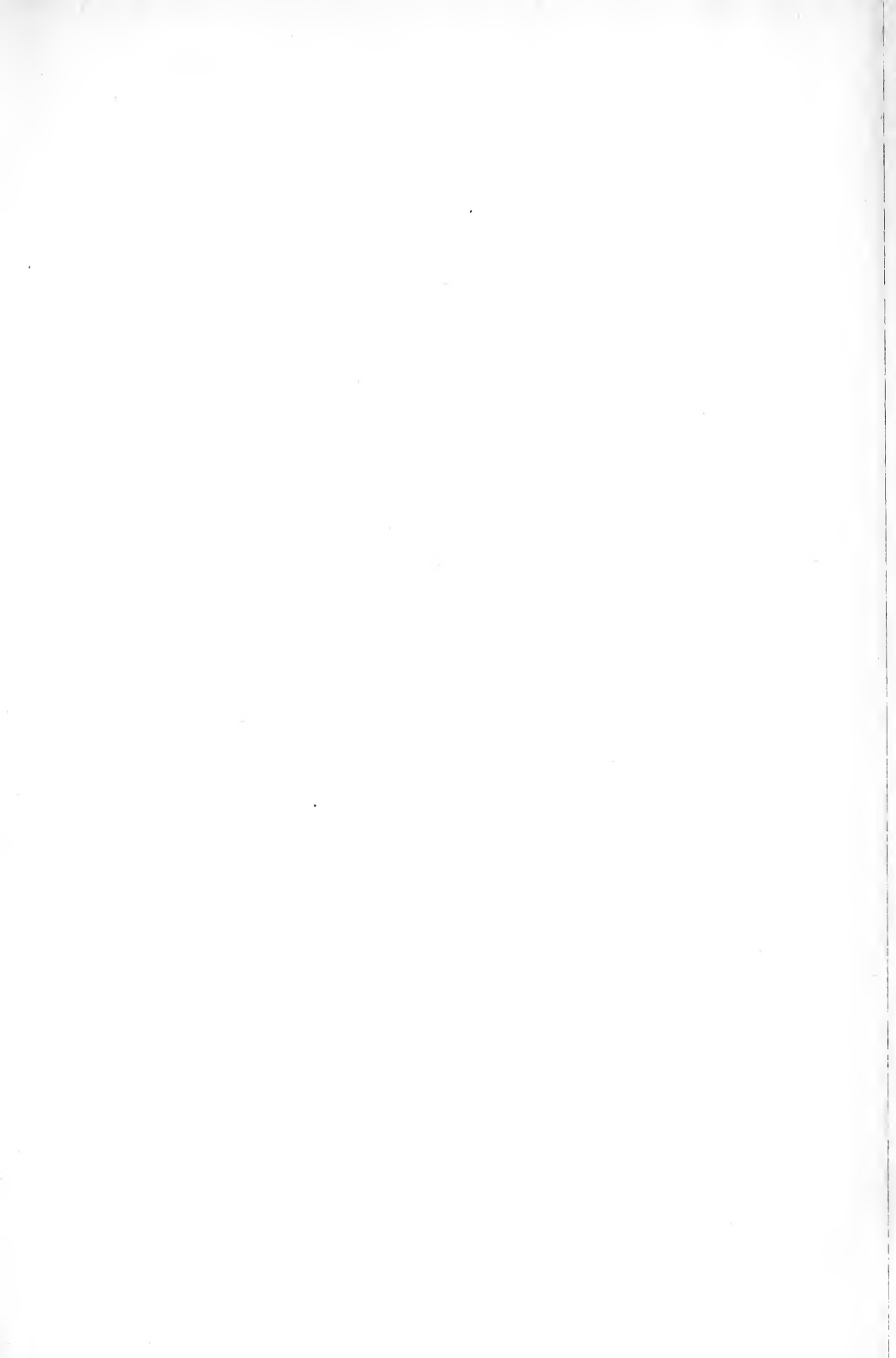
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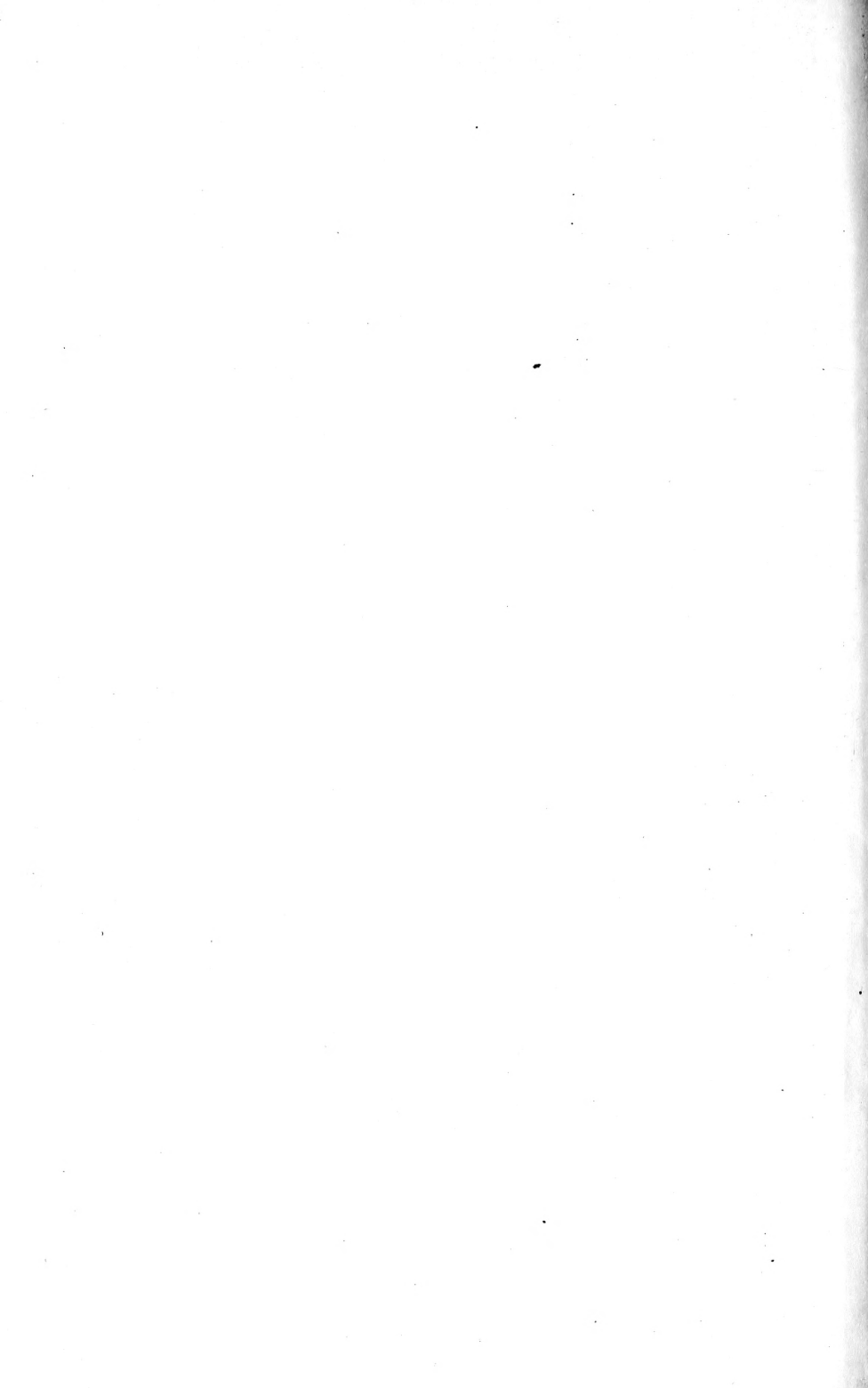












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